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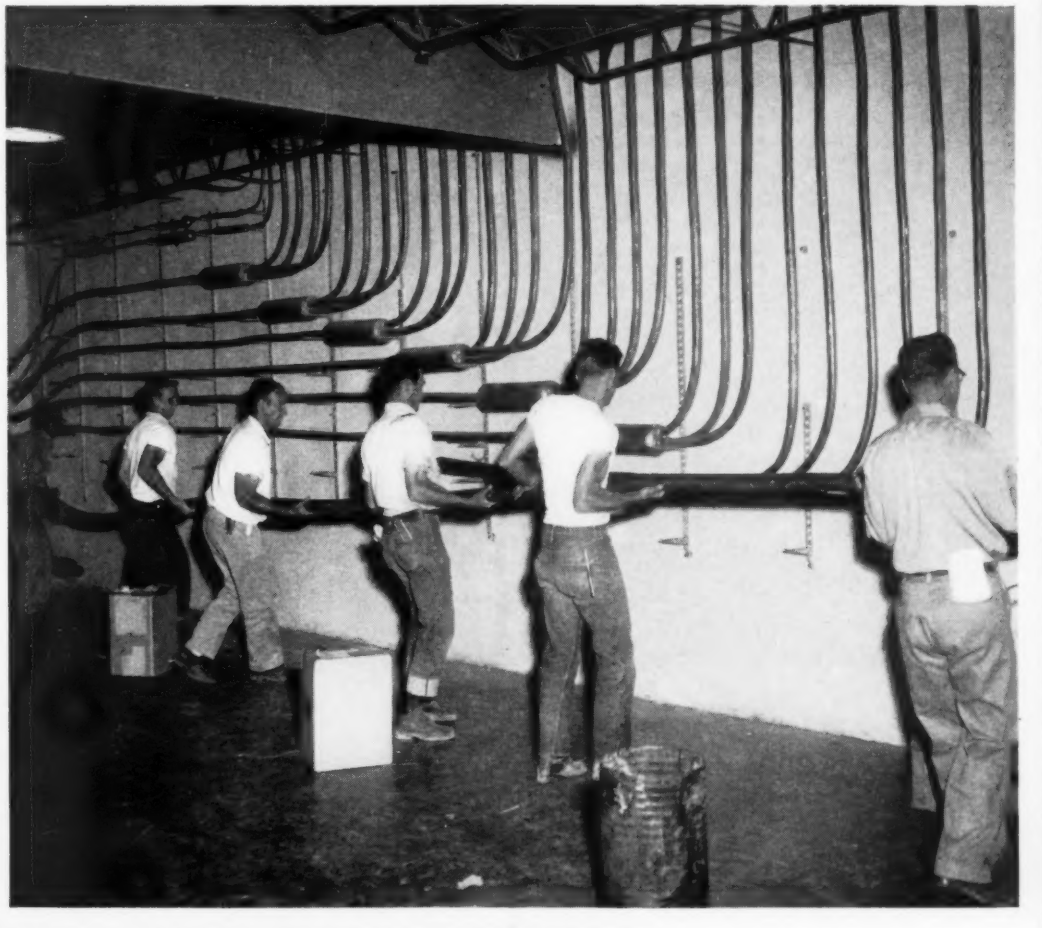
AUGUST 4, 1956
VOL. 151 — NO. 5

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY



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Guaranteed Circulation This Issue
11,326 of Which 10,808 is Paid

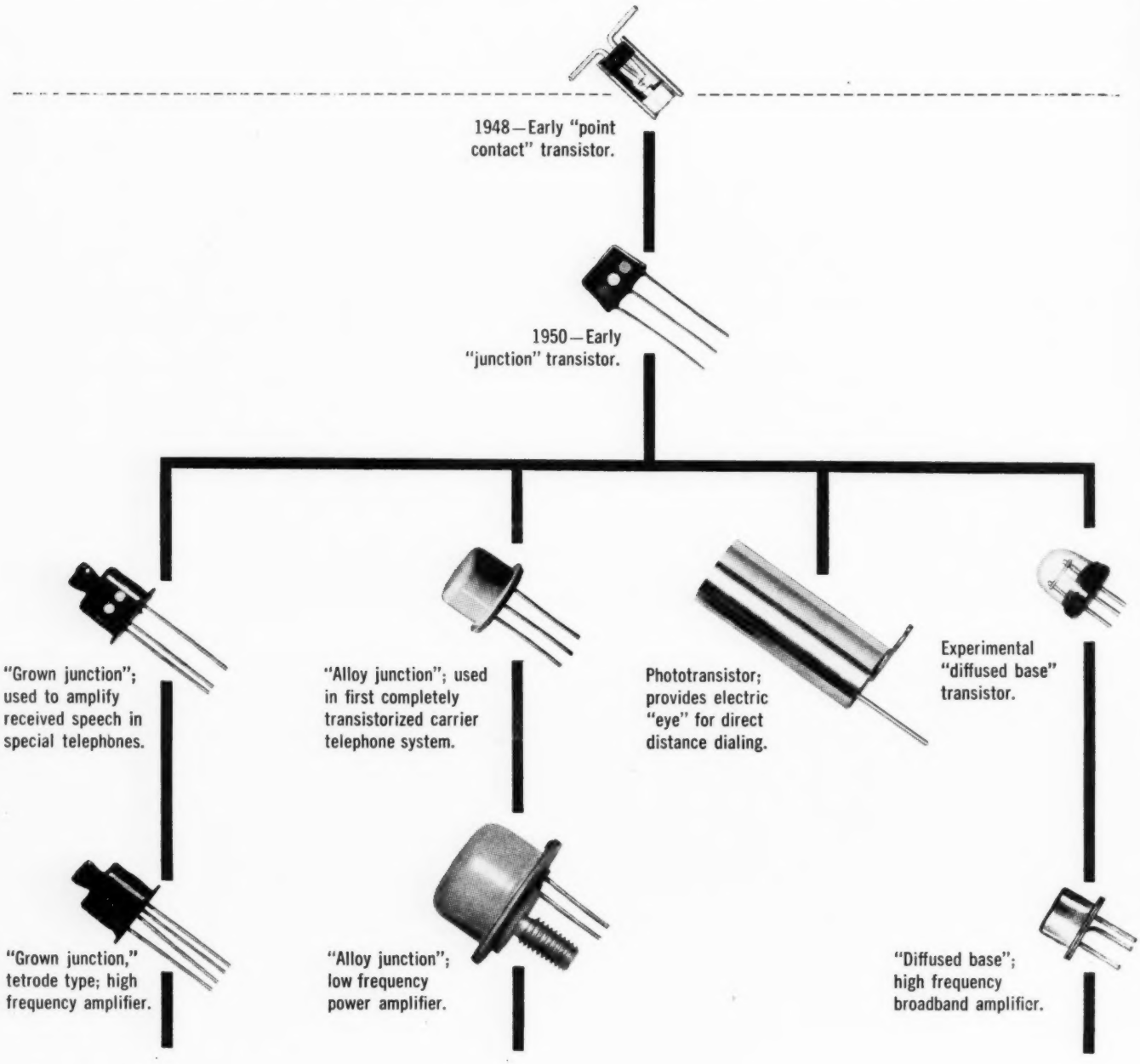
"ALL HANDS ABOARD"

A 2121-pair cable is being placed on the rack in the basement of the central office at Hobbs, N. M. exchange by employes of the General Telephone Company of the Southwest.

MANAGEMENT • PLANT • TRAFFIC • COMMERCIAL • LEGAL • ACCOUNTING

XUM

TRANSISTORS—first family of electronics


1948—Early "point contact" transistor.
1950—Early "junction" transistor.
"Grown junction"; used to amplify received speech in special telephones.
"Alloy junction"; used in first completely transistorized carrier telephone system.
Phototransistor; provides electric "eye" for direct distance dialing.
Experimental "diffused base" transistor.
"Grown junction," tetrode type; high frequency amplifier.
"Alloy junction"; low frequency power amplifier.
"Diffused base"; high frequency broadband amplifier.

In 1948 Bell scientists announced their invention of the transistor—a tiny device able to amplify signals a hundred thousand times using a small fraction of the power of an electron tube.

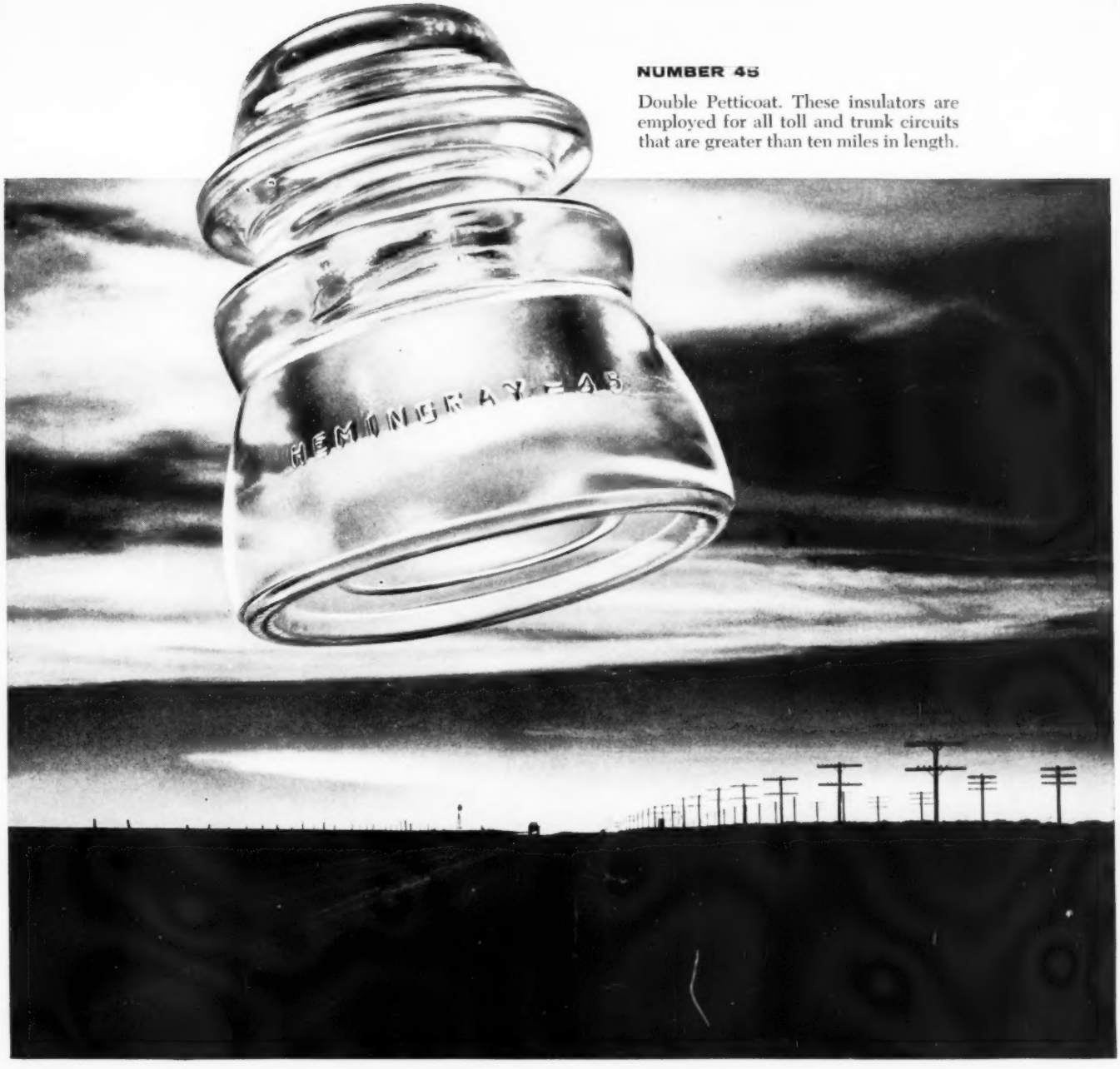
From this original "point contact" transistor has grown a distinguished family of immense usefulness to electronics. Some of its leading members are shown here, in approximate actual size, with their scientific type names.

For telephony the transistor has opened the way for notable advances in instruments, transmission and switching. Elsewhere it has opened the way to advances in hearing aids, television, computers, portable radios and numerous military applications.

Bell's transistor family is typical of the Bell Laboratories research that helps keep your telephone service the world's best—and at the same time contributes importantly to other fields of technology.

BELL TELEPHONE LABORATORIES

WORLD CENTER OF COMMUNICATIONS RESEARCH AND DEVELOPMENT



NUMBER 45

Double Petticoat. These insulators are employed for all toll and trunk circuits that are greater than ten miles in length.

First choice

on communication lines of the world

Since 1870, when Robert Hemingray began mass production of screw-thread insulators, Hemingray has pioneered most of the insulator developments to keep pace with the requirements of the communication systems of the world.

Today, as always, Hemingrays are world standard for quality, and most of the overhead telegraph and telephone lines of the world are carried on *dependable* Hemingray Glass insulators. They are a product of Kimble Glass Company, subsidiary of Owens-Illinois, Toledo 1, Ohio.

HEMINGRAY INSULATORS
AN (O) PRODUCT

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GENERAL OFFICES · TOLEDO 1, OHIO

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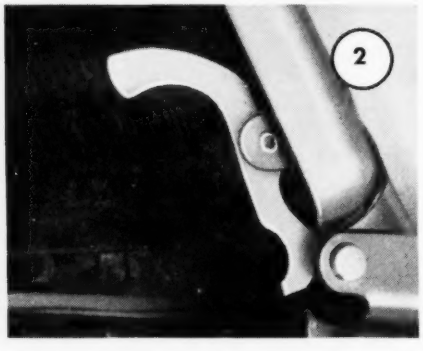
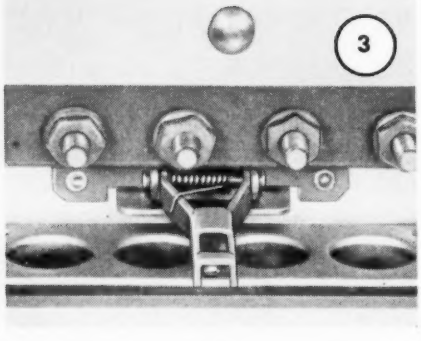
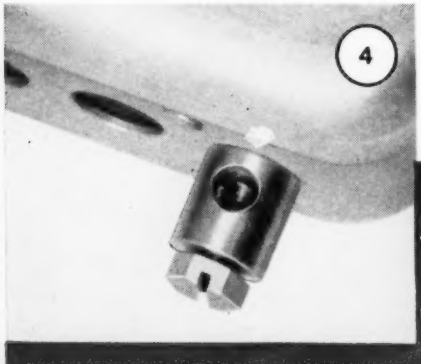
Stranterm

FIRST SHOWING OF

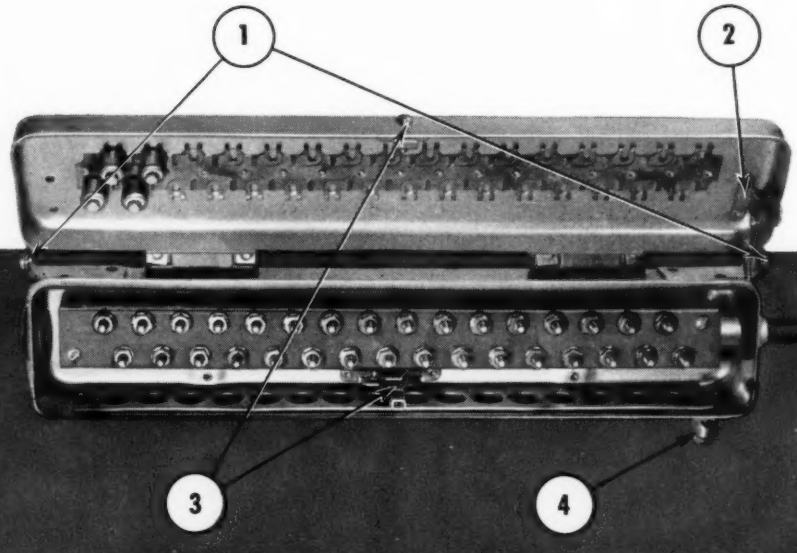






IMPORTANT IMPROVEMENTS WHICH THE 1957 MODELS WILL FEATURE

1. **WIDE ARC COVER HINGE:** Which makes interior of terminal more accessible for servicing. Hinges are of heavy stainless steel construction and reinforced.
2. **AUTOMATIC COVER STOP:** Which holds cover in fixed, open position while terminal is being serviced.
3. **PUSH BUTTON COVER LOCK:** Makes interior of the terminal readily accessible without use of tools and positively locks cover against impact or vibration.
4. **HEAVY DUTY GROUND STUD:** Conveniently located for outside wiring of No. 6 bare or insulated ground wire when applying protection.

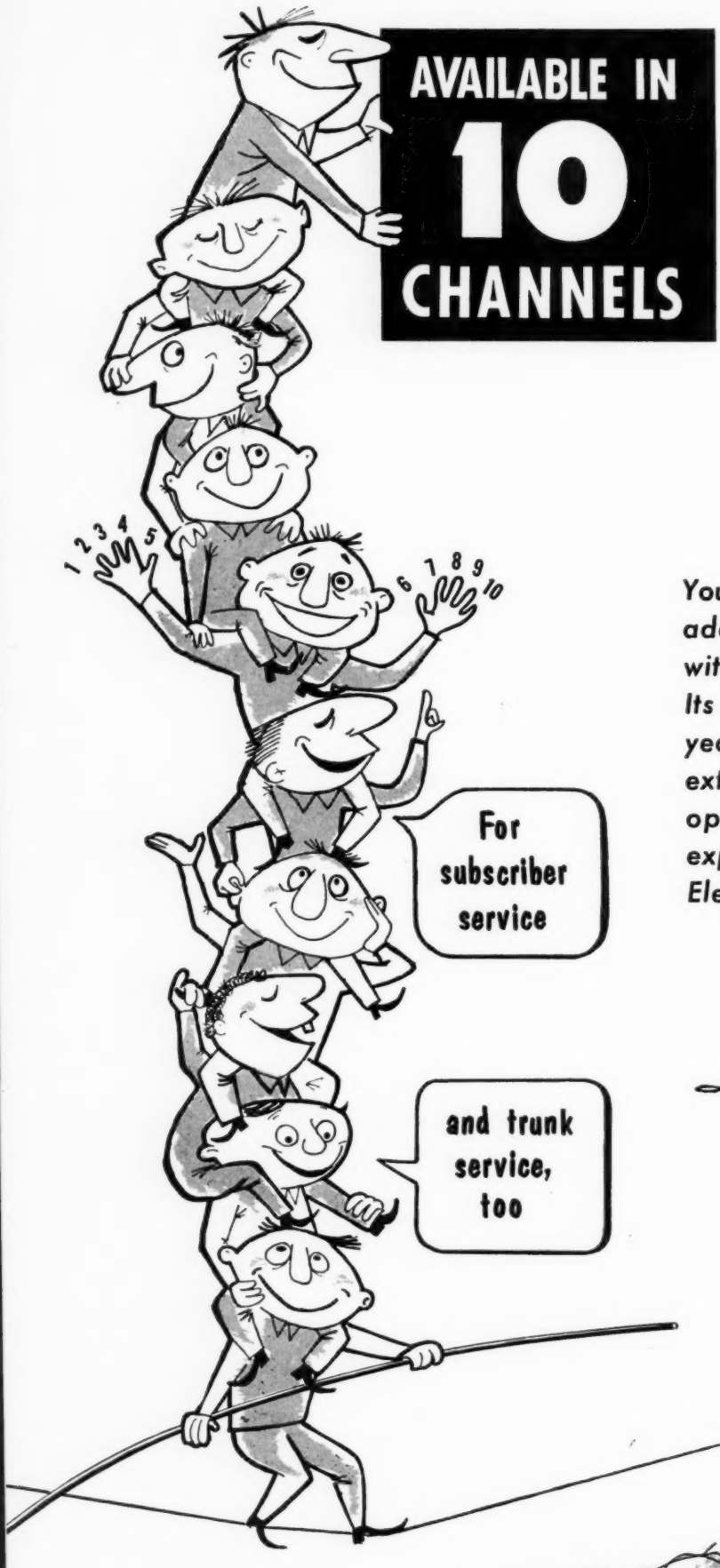


THE 1957 MODEL WITH IMPROVEMENTS FOR THE FUTURE

Distributors will soon be showing the new 1957 Stranterms in three new body styles, and capacities ranging through 6, 11, 16 and 26 pair sizes.

The new Stranterms are provided with an alodized, aluminum alloy, drawn metal body. Door latching members and cover supports are interior positioned. The doors are arranged to lift and set in a raised position while the terminal is being serviced. When ready to close, the latch is released, and the door is "pushed home" where it is rigidly locked. Inland Testing Laboratories tests show this terminal to be weather-proof and rain tight when deluged with water. The terminal is light in weight, easy to install and very convenient for connecting or changing drops. It is furnished with either lead or plastic stubs. Stranterm also features an ingenious bell shaped cable nozzle which eliminates cable breakage due to excessive right angle bends.

The Stranterm is the only Strand Mounted Terminal which may be initially installed unprotected and can later be protected optionally, on a pair by pair basis by the easy insertion of snap-in Minigap or Mytigap Arresters as determined by the outside plant engineers' requirements. We suggest that you try a Stranterm today and investigate the economies and improvements now made possible in your outside plant construction.



A PROVEN COST

You can increase subscriber satisfaction and add new revenue to your existing facilities with this remarkable FM telephone carrier. Its superior quality has been proved by five years of field testing and it is now being extensively used by the largest telephone operating companies in America. Made expressly for Kellogg by the Panhandle Electrical Construction Company.

Another Quality product offered exclusively by Kellogg

SAVING FM TELEPHONE CARRIER

Check these advantages:

- Provides more channels . . . 10 channels per circuit . . . 20 channels per pole lead . . . will not interfere with standard AM carriers on the same circuit.
- Saves you money . . . actually a low original investment which pays off in *low* maintenance costs.
- Satisfies your customers. High carrier gain and wide voice band make signals come through loud and clear.
- No synchronization necessary.
- Constant voice level regardless of variations in circuit attenuation.
- Carrier frequencies are crystal controlled insuring maximum stability of operation.
- Accommodates all types of signaling, including 10-party full selective divided or bridged ringing, code ringing, superimposed ringing . . . E & M dial signaling, too!
- Gives you trunk service, too . . . ideally suited for additional economical toll or EAS trunks.
- Offers you a complete line . . . outdoor cabinets, subscriber drop and transfer filters, emergency power supply, carrier frequency repeaters.
- Makes servicing easy . . . parts are interchangeable . . . transmitters, receivers, power supply, signal unit—everything all plug-in. Field maintenance is much simpler.
- Fits in with your present equipment . . . will not interfere with most multi-channel carrier systems... operates from 48 volt battery or commercial power line.
- Makes installation easy . . . averages less than a day for one man.

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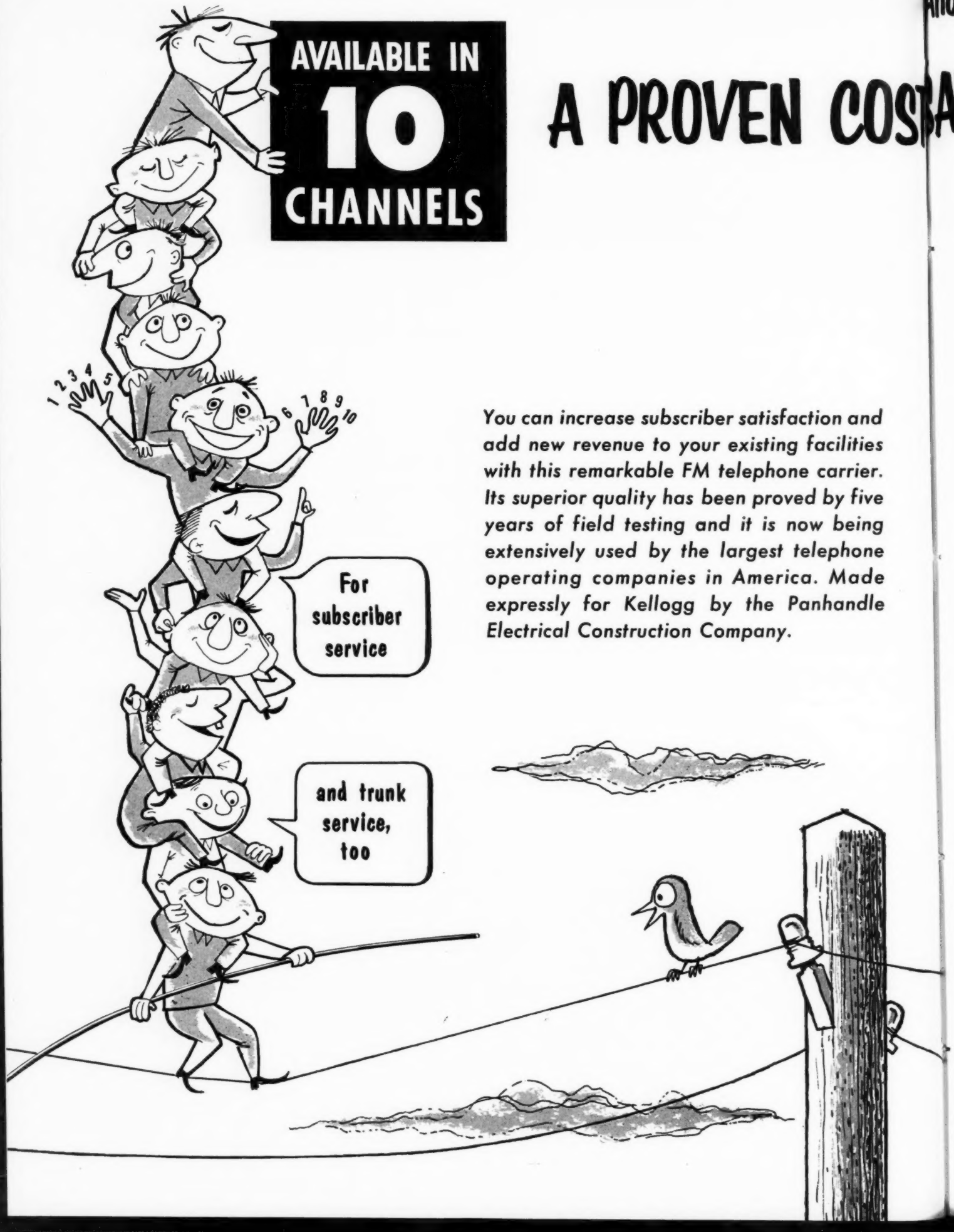

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XUM

FLASHES AND PLUGS

USE OF TELEPHONE NUMBER DANGEROUS. Edwin Mosler, of the Mosler Safe Co. in Chicago, said, "When you select a combination for your safe always pick your numbers out of thin air, so that nobody can learn the combination to your safe by a little thought and imagination.

"The smart crook will investigate familiar numbers like anniversary dates, addresses and telephone numbers of a prospective victim in advance."

He related the story of a repairman sent to a bank in Tennessee. A new vault had just been installed and the only man who knew the combination had been killed in an accident. The repairman went to work collecting familiar numbers of the man and his family.

"After arranging and rearranging these numbers for two days with no results, he decided the only thing to do was to drill the safe open. Just before he started, he noticed right next to the telephone some of the bank's stationery and read:

"Founded 1888, new building opened, 1928." Four turns of the dial opened the safe.

•

AH, LOGIC. An eight-year-old boy returning from a swimming class at the YMCA, recently entered a paystation to call his mother, reports Lotha Sheffer, chief operator of the Richmond (Ind.) Home Telephone Co. He deposited a nickel and dialed the number, but each time the nickel was returned. He finally gave up, deciding the paystation was out of order.

Relating the incident later to his mother, she asked him why he deposited a nickel.

"Well," replied the young swimming champ, with an air of well-worn patience, "don't you put a nickel in to talk five minutes, a dime to talk 10 minutes and a quarter to talk 25 minutes? I really only wanted to talk a minute, but there wasn't a penny slot!"

•

RIGHT SEAT, WRONG BOAT. The Pilgrims landed in America in 1620, and the telephone number in the West New York police headquarters' press room is UNion 7-1620.

So occasionally the Jersey City (N. J.) *Journal* reporter who covers West New York tells people to call him at UNion 7-1620, and adds as a memory aid: "Just dial U-N-7 and then the year the Pilgrims landed."

On a recent Friday the reporter met a man who said he had tried to reach him at the press room earlier but kept getting the wrong number.

"Did you dial UNion 7 and the year the Pilgrims landed?" the newsman asked.

"Sure I did—UNion 7-1492."

CIRCULATION

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THE JOURNAL OF THE TELEPHONE INDUSTRY
Since 1901

August 4, 1956

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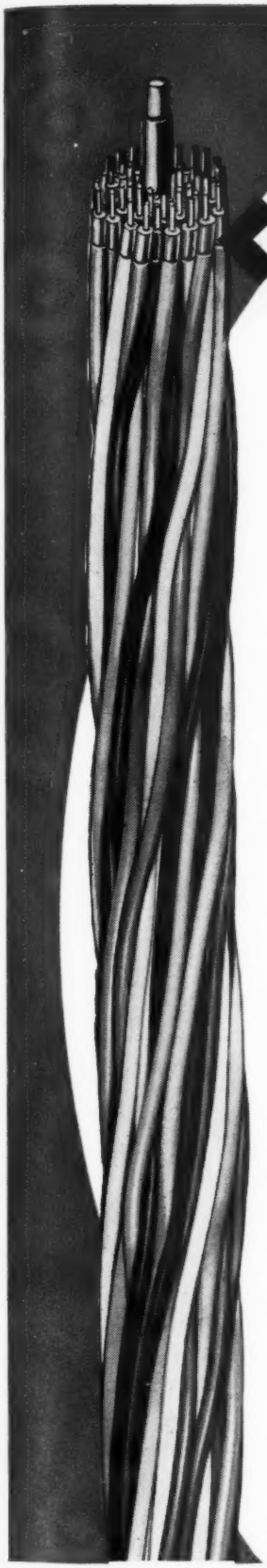

Experience has proved that

DISTRIBUTION WIRE

leads in

SERVICE and ECONOMY

Reports of the unusual performance of WB Distribution Wire under unusual conditions keep coming in. Tales about this wire being laid over rocks and tree branches to provide quick temporary service following storm damage to regular circuits tell of quick repairs and perfect wire performance. Such uses are not common but such performance is expected not only of WB Distribution Wire, but all WB products.

WB Distribution Wire is made in 3, 6, 11 and 16 pair, completely color coded. Each conductor has No. 19 AWG soft copper conductors, polyethylene insulation and polyvinyl chloride jacket. Paired conductors are twisted around polyethylene-covered, high strength steel core. Excellent electrical qualities, long service life contribute to the true economy that comes from high quality.

INDEPENDENT

WB *has* that which others have yet to gain . . . EXPERIENCE

Well Built Wires Since 1899

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WHITNEY BLAKE COMPANY

NEW HAVEN 14, CONNECTICUT

DID YOU EVER

see 3 nicer PABX installations?

They're by the Middle States Telephone Company of Illinois

The equipment is by LEICH

Park Ridge and Des Plaines are two of Chicago's "growingest" suburbs. The many business firms moving to these towns provide great telephone revenue opportunities for the Middle States Telephone Company which serves these two towns.

Middle States chose the Leich Dial System as the most practical and efficient way to furnish modern PABX service to these new business customers shown here.

WHY LEICH?

The Leich Dial System with its all-relay operation is ideal for PABX installations. It requires very little maintenance, takes a minimum of space, operates quietly and efficiently for long periods without any attention.

With the Leich Dial System your PABX customers can have their choice of every desirable service feature. There's ample capacity for main exchange, foreign, information and tie trunks.

Attractive floor type or keyset attendant's cabinets can be furnished to customers specifications.

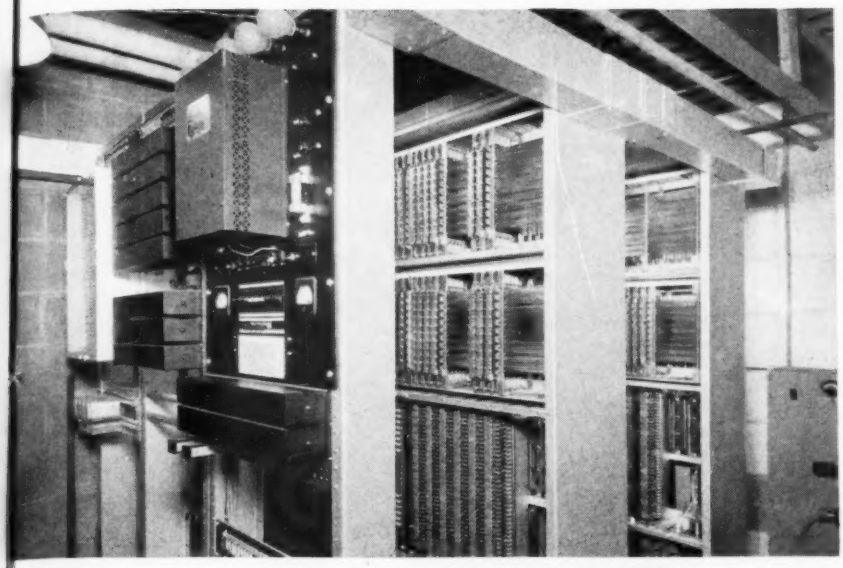
From the telephone company's standpoint, this is a practical investment. For with the Leich Dial System you can quickly and inexpensively add lines or links by jacking them in on the switchboard.

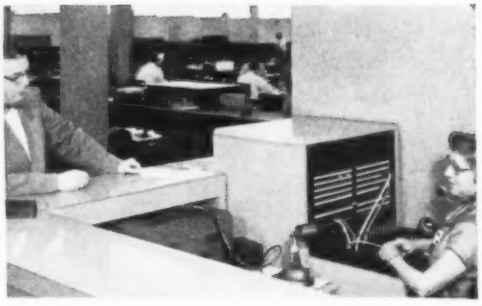
If there are any PABX prospects in your territory, we shall be glad to quote you on a Leich Dial System PABX.

There's no charge or obligation. Let's hear from you.

LEICH

LEICH SALES CORPORATION, 427 WEST RANDOLPH STREET, CHICAGO 6, ILLI



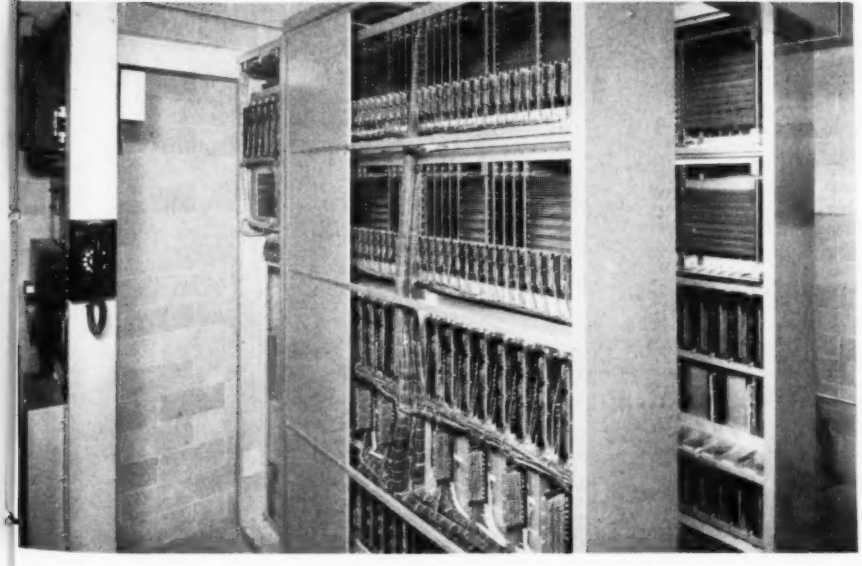


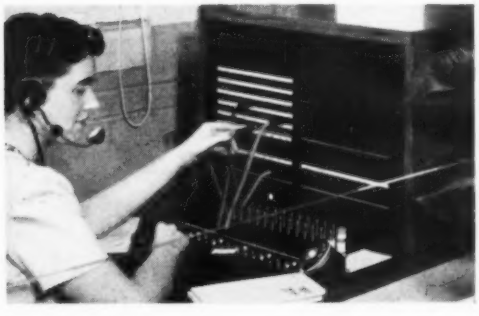
BUTLER BROTHERS

140 lines, 18 trunks, 16 links, single position attendant's switchboard. The Leich Dial System is wired for 200 lines.

GENERAL MILLS

100 lines, 24 trunks, 16 links, two position attendant's switchboard. Wired for 200 lines.





FASTEX DIVISION
ILLINOIS TOOL WORKS

100 lines, 14 trunks, 10 links, single position attendant's switchboard. Wired for 200 lines.

manufacturers of telephones, switchboards and related apparatus since 1907

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"Any man who can operate a telephone system can operate a CARRIER system!"

says H. C. Slusher, Vice President and General Manager, Commonwealth Telephone Company of Ohio.

Lenkurt Type 33A Carrier was especially designed for those with little or no experience with carrier. You don't need high-frequency experts on your staff to enjoy all the benefits its additional circuits will give you.

Easy to install. Whether you install it yourself, or have us do the job, a Type 33A Carrier System comes to you pre-assembled and pretested — ready for installation on delivery.

Easy to expand. You can start with a single channel, add a second, then a third. No more lines to string, no construction man-hours wasted.

Easy on the budget, too. Initial cost is low—it's by far the least expensive way to add new channels.

What's more, Automatic's engineering service is available at any time during the life of your Lenkurt Carrier System. Our communication specialists stand ready to provide personal advice and service every step of the way.

Discover how a Lenkurt Carrier System can help solve *your* communications problems. Contact Automatic Electric carrier engineers for their specific recommendations. *Address*: Automatic Electric Sales Corporation, 1033 West Van Buren Street (HAymarket 1-4300), Chicago 7, Illinois. *In Canada*: Automatic Electric Sales (Canada) Ltd., Toronto. *Offices in principal cities.*

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Originators of the dial telephone • Pioneers in automatic control

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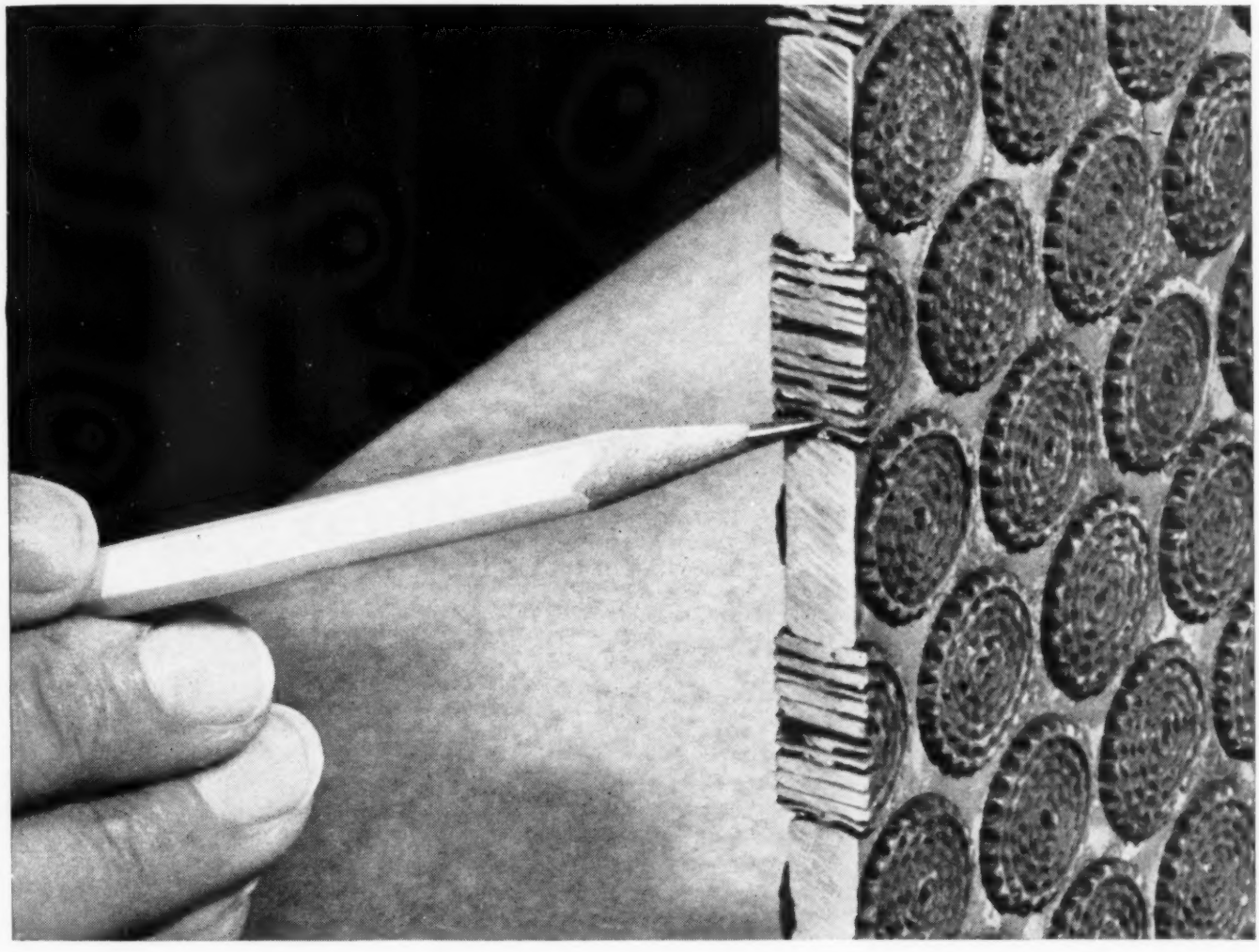
Continuous and emergency power for telephone systems



Spiral buttons act like shelves for oxide—prolong battery life

TELEPHONE BATTERY. Exide-Manchex Batteries are available in a wide range of capacities from 40 to 960 ampere hours. Compact construction saves space and weight. Flat cover easy to clean. Write for Bulletin No. 4852.

In ordinary batteries, the active material clings to the vertical surfaces of the positive plate—forever fighting the forces of gravity and turbulence. Let it loosen its grip and down it comes. And there goes battery life.

Not so with Exide-Manchex Batteries. Active material is built up between the spiral layers of these unique lead buttons that act like tiny shelves. There it rests, supported against gravity and electrolyte turbulence. And there it stays for years and years and years.

This simple design principle is one of the several tangible reasons for the long, useful life of Exide-Manchex Batteries. Used in a wide variety of floating service applications, these batteries have earned a reputation for long, dependable service unsurpassed in the entire world. And this method of construction is available only in Exide-Manchex Batteries.

When you order batteries for applications where you need dependable performance and long, useful life, or when you buy equipment using this kind of battery, be sure to specify Exide-Manchex Batteries. Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 2, Pennsylvania.

Exide®

YOUR MOST IMPORTANT C

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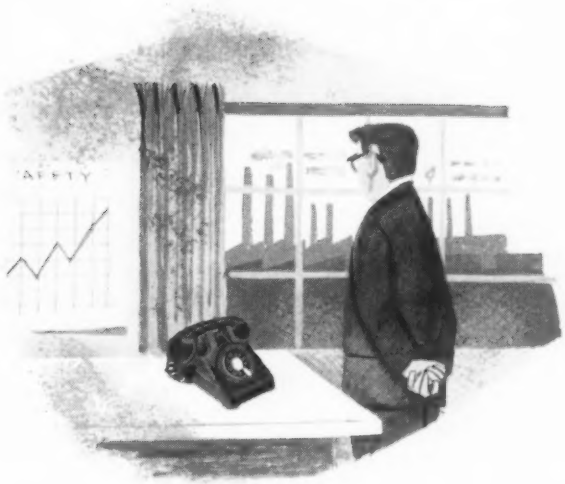

CONTACT WITH

FOLKS WHO PAY THE BILL

Everyday the subscriber sees the telephone instrument, handles it, listens to it, speaks into it.

To the subscriber, that telephone instrument represents **you, your** company, **your** service.

To the extent that you provide the subscriber with an instrument pleasing in appearance, with superior transmission and reception quality, you are increasing the subscriber's satisfaction with you, your company, your service.

The NORTH N-541 Telephone is a superior instrument on all counts.

The modern, streamlined case and handset have clean, functional lines.

Transmission has been brought to "Hi-Fi" levels. The N-541 Telephone has an improved anti-sidetone circuit and a higher gain which provides clear, natural transmission over long loops. An automatic compensating network insures the same clear, well controlled level on short loop transmission.

SUBSCRIBER SATISFACTION WILL BE GREATER WHEN YOU STANDARDIZE WITH

NORTH N-541 TELEPHONES

ALSO AVAILABLE IN COLOR

NORTH ELECTRIC COMPANY

601 SOUTH MARKET STREET • GALION, OHIO

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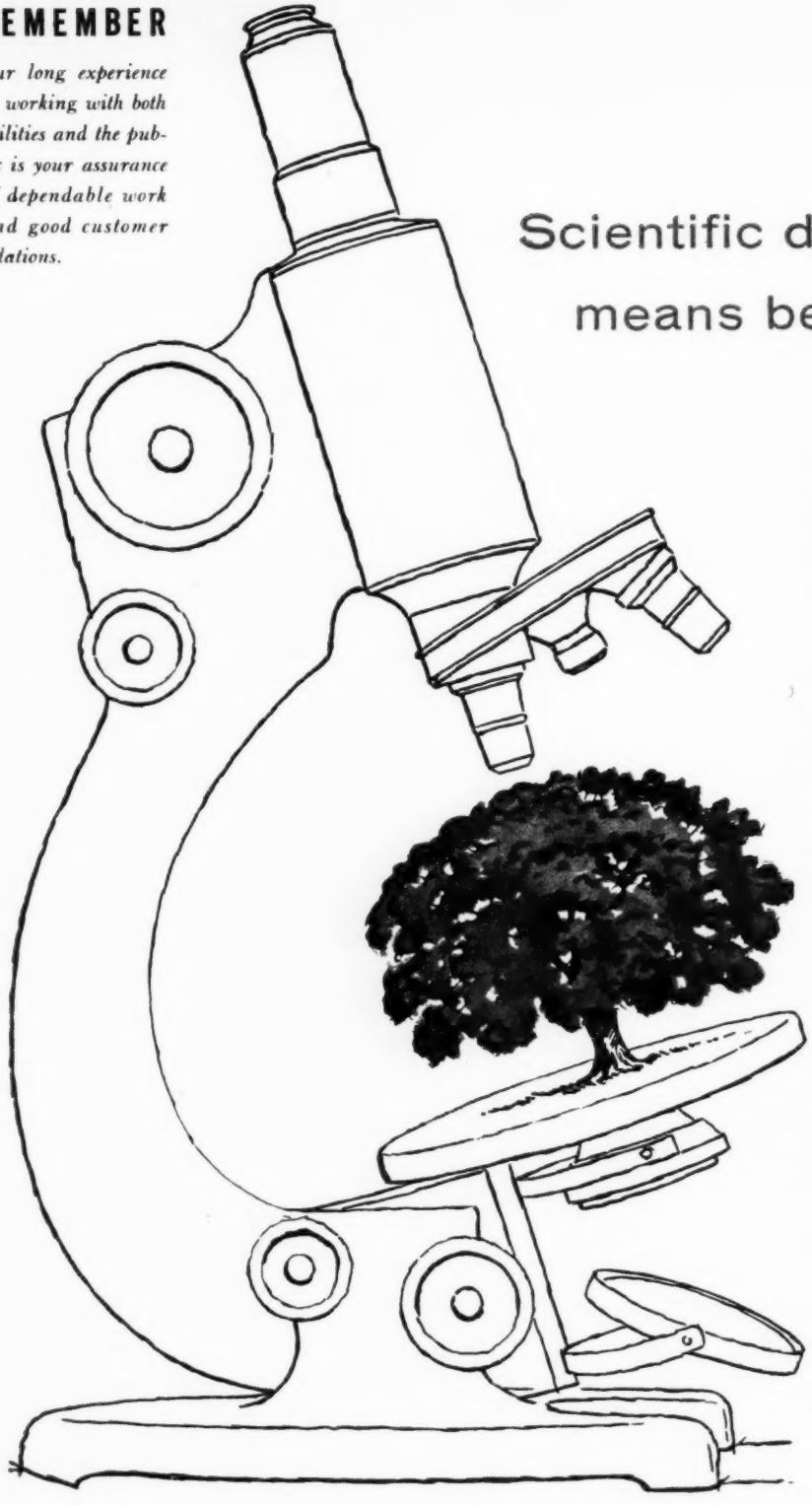

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IN THE NATION'S CAPITAL

BY FRANCIS X. WELCH, WASHINGTON EDITOR

Gives last look to performance of 84th Congress. Finds lack of informed writing on American private enterprise system—recommends Hazlitt's "Free Man's Library" bibliography. Demolishes anti-commission regulation writer's criticisms.

THE 84th Congress went out like a lamb with dozens and dozens of important measures left at the post. But, as pointed out in this department last week, the telephone industry had no cause to complain—as far as legislation especially affecting them was concerned. There was the highway bill, passed with the utility relocation reimbursement provision "included in," as Sam Goldwyn would say. And there was the Wage-Hour minimum, boosted from 75 cents to a dollar, but with the threatened change of the small telephone exchange operators exemption "included out."

There was the amendment to the Federal Communication Act, which simplifies telephone company corporate organization routines and property sale procedures before the FCC. This passed finally and went to the White House for Eisenhower's signature.

There was one little unexpected piece of last-minute legislation that may turn out to bring in a nice piece of business for telephone companies operating near coastal waters or tidal rivers, where there is a substantial amount of commercial boat traffic. This is a bill requiring all vessels carrying more than six passengers for hire, on the open sea or tidewaters, to have radio-telephones. Designed as a safety measure, this bill, as originally passed in the House, was amended in the Senate on motion of Sen. John W. Bricker (R., O.) so as to exempt fishing party boats on the Great Lakes.

This legislation grows out of a tragedy on Chesapeake Bay during one of the hurricanes last year, when a chartered sail boat foundered with considerable loss of life. Goes to show the wisdom of the old saying about the "ill wind." Smart salesmen for telephone companies, having ship-to-shore service available, ought to pick up a tidy bit on this windfall legislation among the commercial Scotch-and-soda fleet, and the masters of assorted cabin cruisers and the sail boats for hire.

In its last week, the record of the 84th Congress was more noteworthy for what it did *not* do to legislation affecting utilities, than for what it did. The Democratic public power bloc got a clean strike out on three very important matters which would have advanced the cause of federal socialization of the electric utility industry immeasurably, if any of them had connected.

The first whiff by the left wing public power bloc was on the controversial Hell's Canyon Dam bill—to build a federal high dam on the Snake River in Idaho and to cancel licenses already issued by the Federal Power Commission to the Idaho Power Co. to build three smaller hydroelectric dams.

The Bill was defeated 51-41 in the Senate—leaving the two Oregon members, Morse and Nueberger with very red faces after the way they have been screaming about a G.O.P. plot to keep the bill bottled up in committee, so as to avoid an "open and honest" vote on the floors of Congress.

The second strike was on the bill to put the state of New York further into the power business by granting the New York State Power Authority the right to develop and sell Niagara river power, with the usual discriminatory preference in favor of publicly owned, tax-free electric utility agencies and co-ops. This bill was very threatening, but it was finally left at the post in the House after passing the Senate.

The third and most important "miss" for the public ownership crowd was the outright defeat, in the House of Representatives, of the Senate-approved "Gore Bill." This measure would have forced the Atomic Energy Commission to develop, build and operate a number of atomic power plants.

While the excuse for all this was the alleged need for the federal government to make haste and "take the lead," the crowd behind it was the same old bunch who are always trying to shove Uncle Sam further and further into the power business anywhere, anyway, anyhow and no matter what. The advent of Uncle Sam in the atomic power field on a commercial basis would shove the big nose of the socialist camel under a brand new tent which ought to be reserved for private enterprise if at all possible.

The Democratic-controlled Congress now ending enacted most—but not all—of President Eisenhower's legislative program. Despite inevitable election-year sniping, Congress rejected less than a half-dozen major bills pushed by the President. Others, of course, it reshaped or modified.

This year's seven-month session will be put down as a political stand-off in many ways—providing little campaign ammunition for either party to use this fall. Democrats can and will claim that they gave substantial support to a Republican President—in a few instances more than members of his own party.

And Mr. Eisenhower, when Democratic candidates fire away at his program in the campaign, can and will claim that most of it won approval from a Democratic Congress. The President's worst defeats came on bills subject to Congressional taboos which often have killed similar measures in the past.

In this category were White House-

backed measures on civil rights, federal aid to education, immigration law revision, postal rate increases and statehood for Hawaii. They died despite rather than because of the President's support.

One of the real problems of the private enterprise system in the United States is keeping people informed about the performance of the system. American businessmen are traditionally doers rather than talkers. When it comes to an argument about the merits of the enterprise system, it is generally found that the critics of the system have done most of the talking and writing while the businessmen have been responsible for actual performance.

The net result of that is a lot of people who take all the advantages and accomplishments of our American enterprise system for granted—even while they read books by ivory tower professors, who keep repeating charges and

REA Makes Four Telephone Loans for $1,464,000

The Rural Electrification Administration made four telephone loans totaling $1,464,000 during the period July 16-20, the U. S. Department of Agriculture announced on July 16. More than 3,000 farmers and other rural people in Minnesota, North Carolina, South Dakota and West Virginia will get new and improved service as a result of the loans. Details follow:

Pinebluff (N. C.) Telephone Co., Inc., on July 17 was extended an allocation of $132,000, first loan, to improve and extend rural telephone service in Hoke, Moore, Richmond and Scotland counties.

The borrower is a commercial corporation. It plans to convert its system to automatic operation and to add facilities to serve 158 farm families in its area now without service. At this time the company provides magneto service to 160 rural subscribers over 29 miles of line.

The borrower plans to construct 29 miles of new line and install automatic facilities. All of the existing line will be rebuilt for use.

Mrs. A. G. Wallace is president and E. H. Mills is manager of the Pinebluff company.

*

Deuel Telephone Cooperative Assoc., Clear Lake, S. D., on July 18 was extended a loan of $852,000, third REA loan.

The cooperative proposes to provide new and improved service to 1,689 subscribers, including 609 farm families now without telephones. To accomplish this, the cooperative plans to extend its service area into Hamlin and Moody counties in South Dakota, and Pipestone County in Minnesota. It will also serve additional territory in Deuel and Brookings counties in South Dakota as well as in Lincoln County, Minnesota.

As a nucleus for the new service, the borrower proposes to acquire the following telephone properties; the Estelline, Toronto and White exchanges now being operated by the Sokota Automatic Telephone Co.; the Elkton exchange now operated by the Sioux Valley Telephone Co.; and the Lake Benton exchange now operated by the Lincoln County Telephone Co. These exchanges are now providing dial service to 1,080 rural subscribers over 318 miles of line, and switching service for 129 rural families who own their own lines.

New facilities to serve the expanded system include automatic central offices at Elkton, Estelline, Toronto, White and Lake Benton, and 358 miles of line. The present automatic switchboards are filled to capacity. Of the present line, 186 miles will be rebuilt, 108 used in place.

In addition to the 1,689 regular subscribers, the borrower plans to furnish switching service for 178 families who own their own lines.

REA loans to this borrower to date total $1,771,000. They will enable the cooperative to provide new and improved service to 3,362 subscribers over 1,282 miles of line. The completed system will consist of 10 automatic exchanges of which the Clear Lake and Goodwin are now in operation.

Karn Fromm is president and Neuman Jacobson is manager of the Deuel Telephone cooperative.

*

West Side Telephone Co., Laurel Point, W. Va. (mailing address: Morgantown) on July 19 was extended an allocation of $148,000, first REA loan, to finance the improvement and extension of rural telephone service in Monongalia County.

The borrower is a commercial company which proposes to provide service for the first time to 125 farm families in its area. In addition, it will improve service for its 245 existing subscribers.

At present, the company is providing magneto and common battery service over 34 miles of line. New construction planned by the borrower includes an automatic central office at Laurel Point and 50 miles of line. Three miles of the existing line will be rebuilt. The West Side company plans to continue the service without toll charge between the borrower's exchange and Morgantown.

Cecil Dodrill is president and D. C. Dodrill is manager of the West Side company.

*

Wendell (Minn.) Telephone Co., on July 20 was extended a loan of $332,000, first REA loan, to improve and extend rural service in Grant, Traverse and Wilkin counties.

The borrower, a commercial corporation, plans to provide initial service to 204 rural families, and improved service for its present 438 subscribers. Included among existing subscribers are 72 farm families who own their own lines. The Wendell company now furnishes magneto service over 137 miles of line with central offices at Norcross, Tintah and Wendell.

New construction proposed by the borrower includes 122 miles of new line, automatic central offices at Norcross and Tintah, and a combined automatic exchange and headquarters building at Wendell. Of the existing line, 108 miles will be rebuilt and 29 miles used in place in the expanded system. The 72 switchers plan to become regular subscribers of the Wendell company as soon as service is available.

Charles H. Severson is president and H. William Severson is manager of the Wendell Telephone Co.

criticisms and often imply that the enterprise is a failure.

Make this test for yourself as the cigarette ads say. Pick up, at random, the textbooks being used on political economy in a dozen universities. You are likely to find a majority containing views openly hostile to the American enterprise system and some downright in favor of a "managed economy," which is a polite phrase for socialism.

Why is this? Has the enterprise system no sound arguments to justify its existence? Are the practitioners of the enterprise system all stupid or inarticulate? The obvious answer by almost any one who has been in business, is a loud long "No" to both of these questions. But the catch comes when it is found that those best able to expound the results of our system, are successful businessmen. They are also quite likely to be very busy and have neither time nor opportunity for much writing requiring extensive individual research. And so, the case for the private enterprise goes largely by default.

One of the leading figures in the Independent telephone industry was discussing this very matter recently with your correspondent, and he made a very penetrating and thoughtful comment on that very point. He said: "The lack of adequate literature has become an occupational risk of the enterprise system."

In other words, people who go out and become successful businessmen know very well that we have the best system, bringing more benefits, to more people, in the United States than any other system in the history of the world. But businessmen do not write textbooks. They don't have time. Often they do not have the technical talent.

The people who do have time are the people who stay in the ivory towers of academic learning. And while some of them are very bright and competent, they often do not know how a dollar is made in the business world, because they have never had to come in contact with that struggle.

All this is by way of saluting a very valuable volume recently published by one of the editors of *Newsweek* magazine, Henry Hazlitt. It is called "The Free Man's Library." It is only a bibliography—a series of references and excerpts, but it belongs in the library of every businessman who is proud of his calling and scornful of those who would undermine and overthrow the enterprise system.

Mr. Hazlitt has taken the trouble to collect and describe every worth-while, available book on economics and related subjects which reflect the conservative view. It is a job that long needed doing, when we consider the constant outpouring of left-wing trash which too often finds its way into the classroom of our higher colleges and universities. Hazlitt's volume is a good answer to people who ask, after they have been exposed to the endless academic variations on a theme by Marx or Veblen, "Where can I go to get something on the other side?"

Hazlitt has provided a thumbnail sketch of what each listed book contains. He explains that he has long had this idea of compiling a reference book for believers in the enterprise system. He found out by chance that three decades ago a similar compilation had been published in London under the title, "The Philosophy of Individualism." Of course that book has gone long out of date and out of print. But it was a good starting point on which Hazlitt was able to build his present compilation.

While there is much that has been said, and said well, in favor of the enterprise system, there is much that has been left unsaid and which still needs saying. Furthermore, there are many fine things which were written in the past but have somehow slipped into undeserved obscurity, if not oblivion. Most noteworthy were the works of the late Lord Acton.

And one cannot help but reflect and regret that the conservative point of view has not been represented to a greater degree among those who have the responsibility of teaching others during their formative years. It was the late Wendell Willkie who once confessed that he was only one of many campus socialists, during his university years, because that seemed to be the thing to do.

What's more, Willkie said it was not until he went out into the business world and made his own way that he realized what makes the mare go. That is what is known as "practical economics." Too bad they cannot teach it in school.

Criticism of Regulation

Typical of the small but noisy anvil chorus of criticism, which is going on constantly about the "shortcomings" of private enterprise institutions, was a criticism of utility regulation published in the current issue of the "Rural Electrification Magazine" (July). It was written by a professor of economics at one of our larger and more important state universities.

It is forcefully written, as far as technical skill and cohesion is concerned. Yet, it contains so much misinformation or lack of information about what commission regulation is, how it works, that anybody in a public utility business, or in the regulatory field might well wonder where the good professor has been all his life.

This article is, in essence, a long harangue to the effect that commission regulation of public utilities is a "failure," that it has "deteriorated" into a farce, and has become generally "discredited" if not exploded. The managements of privately owned public utility companies are represented as being relentless, conscienceless, avaricious.

Regulatory commissioners are pictured as boobs or knaves or outright hirelings, being led around by their noses by public utility company management. The implied way to save public service from utter collapse and to save the public from cruel extortion is to junk commission regulation, and install a lot of publicly owned utility enterprises and cooperatives. These will compete with the private utilities so as to keep them in line. And it can be plainly read between the lines that the professor is not very strongly in favor of keeping the privately owned utilities in line very long, if some way can be found to get rid of them altogether, in favor of public ownership.

This article cites no facts, gives no figures. It simply repeats, in very strong language—reminiscent of tirades by the Chinese Communists at the Panmunjom Korean armistice—a singsong defamation of commission regulation, as being "generally discredited" and obviously "deteriorated." Like the Communists and the late Mr. Hitler, the idea seems to be that constant repetition will gain believers, regarless of facts.

And what are the facts? The facts are very simple if one wanted to stop several dozen persons on the street and ask them what they think about commission regulation of public utilities. Unfortunately a good many would probably reply that they never heard of it.

But the answers would certainly not bear out the professor's strawman argument that commission regulation is a failure, simply because he says so so often. Such an opinion poll would certainly produce no evidence of any "widespread" belief that regulation had collapsed or was deteriorating or was generally discredited.

In fact one could easily puncture all the professor's fine-spun arguments with about a dozen well-aimed questions, such as the following: In what country are there, today, more telephones than in all the rest of the world combined? What country has

(Please turn to page 41)

Some Methods of Measuring Ground Resistance

By RAY BLAIN

HISTORY informs us that back in 1837 someone discovered that the earth could be used as a conductor in an electrical circuit. Perhaps it also has been known for almost an equal length of time that the earth can be used as a means of dissipating excessive charges caused from lightning or power circuits.

Grounding serves an important function in the operation of our telephone systems by protecting lines and equipment from disturbances resulting from these external sources of electrical energy. The effects in the telephone plant may be confined to interference with its normal use or operation or they may create hazards to the public, telephone personnel and plant.

Ground resistance may be defined as the electrical resistance to the flow of current between the lines and/or equipment and the earth.

To be effective, a ground connection must have a resistance low enough so that it will not interfere with the rapid operation of protective devices, or the discharge of lightning, or fault current to the earth. Otherwise, voltages may build up on the lines which will damage the insulation or equipment or create a hazard to personnel.

Frequently, protective equipment is blamed for telephone plant damage when actually a high resistance ground is the cause of the trouble. The purpose of this article is to explain in detail how simple tests can be made to determine whether an installed ground connection is satisfactory for the purpose intended and if it will provide necessary protection.

It can never be assumed that a ground rod, driven 8 feet into the earth, will have a satisfactory low resistance. Soil conditions vary widely within a relatively small area and a rod driven a few feet from another rod of the same type may not have the same resistance. The only way to be certain in this respect is to measure the resistance of each ground connection.

There are several approved practices for measuring the resistance of installed ground electrodes. These practices are all similar in that two auxiliary or reference electrodes are required in addition to the ground under test.

Short rods 2 or 3 feet in length may be used for these auxiliary grounds, and they should be located at a distance remote enough from the ground under test and from each other to insure that each is independent of any proximity effect of the other two rods.

We shall now attempt to clarify the various methods of measuring ground resistance under three general headings as follows:

Direct-reading, self contained ground testing instruments.

Three-point method using ac or dc with ammeter and voltmeter.

Fall-of-potential method using ac or dc with ammeter and voltmeter.

Perhaps portable ground testing instruments provide the most convenient and all-around satisfactory means of measuring the resistance of grounds. These instruments are self-contained, easy to operate and the resistance is read directly from a calibrated dial or meter located on the panel of the instrument. The measurement is made with one set-up using two auxiliary electrodes and the entire operation may be performed by one man.

Where any general program of ground testing is planned, or even when only a few grounds are to be measured, an instrument of this type is recom-

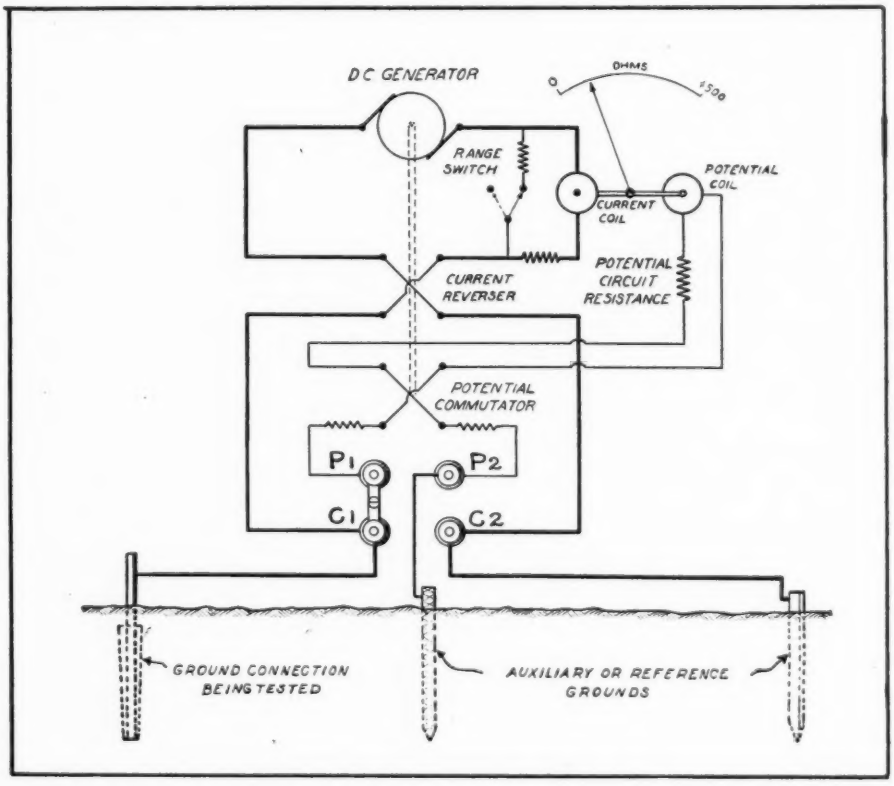

Fig. 1. Schematic diagram of connections of the "Megger" ground tester showing the principle of operation.

mended as the convenience and saving in labor will in every case more than justify its cost.

There are a number of direct-reading ground testing meters available and each type will be described briefly. When using any of these instruments, care in handling is necessary as delicate equipment such as a galvanometer or ohmmeter is generally employed in the measuring circuit.

"Megger" Ground Tester

"Megger" ground testers are produced by the James G. Biddle Co. of Philadelphia, Pa., and several types of instruments with various ranges in resistance readings are available. The functional principle of operation of the "Megger" ground tester is that of the ac fall-of-potential method. The method of connecting the "Megger" and its principle of operation is shown in *Fig. 1.* Current is supplied by the self-contained, dc hand-driven generator and after passing through the current coil of the ohmmeter it is changed into ac for the test by means of a commutator or current reverser. The potential drop across the ground under test and the potential probe is picked up at P_1 and P_2 and again converted into direct current for activating the potential coil of the ohmmeter. The ratio of this voltage drop to the current is shown by the dc ohmmeter which indicates the resistance of the ground direct in ohms.

When operating at a normal speed of 100 rpm, the open circuit potential is of the order of 50 volts at a frequency of 50 cycles. The current is limited by internal ballast to not over 0.5 ampere. The generator may be operated somewhat above or below the normal speed without affecting the reading of the instrument.

The use of ac for the test eliminates errors due to stray direct currents in the earth and to polarization and electrolysis at the electrodes. If there are any stray alternating currents in the earth these are indicated by the needle on the ohmmeter being unsteady.

In such cases, turning the generator faster or slower produces a current with a frequency different from that of the stray current and thus eliminates the effect of such currents.

Actually, the location of the reference grounds with respect to the ground under test and to each other has a greater effect on the accuracy of the results than the exact resistance to earth of the reference grounds.

When rods are driven 8 feet into the earth, the spacing between the ground being tested and the potential reference ground should be 50 feet, and the current probe should be an additional 50 feet or a total of 100 feet away from the ground being tested.

When rods are driven deep into the earth to reach the better conducting soils, the spacings between the rod being tested and the auxiliary grounds should be substantially increased for accurate measurements.

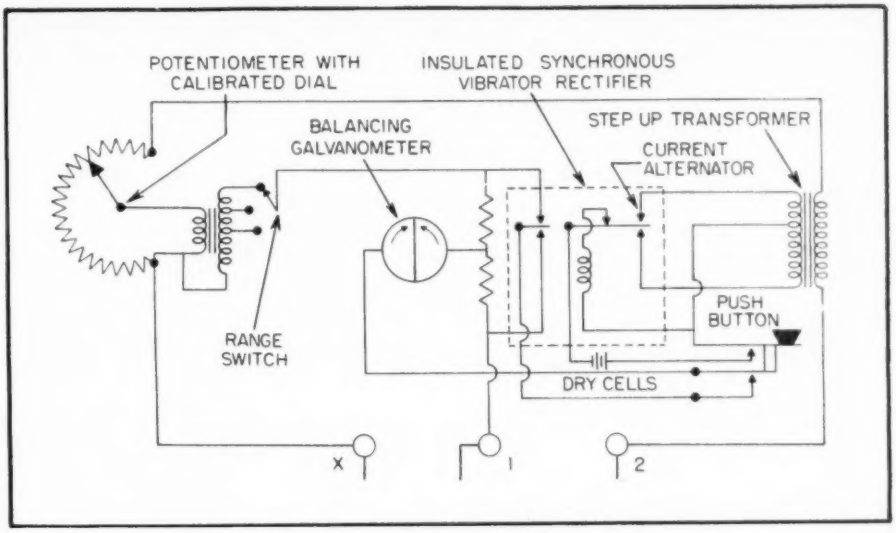

Fig. 2. Vibroground ground tester.

Vibroground Ground Tester

The Vibroground ground testing instruments are manufactured by Associated Research, Inc., of Chicago, Ill., and several different types designed to measure various ranges of resistance are available. One model of this instrument is shown in schematic form in *Fig. 2.*

These ground testers operate on the ac fall-of-potential principle, but use a modified form of Wheatstone bridge to provide a means of measuring the ground resistance. A synchronous vibrator (buzzer) is used to convert direct current from a three-volt battery (dry cell) into alternating or pulsating current. This pulsating current is stepped up to about 140 volts at 97 cycles by means of a transformer.

A range switch and a calibrated potentiometer is used with a balancing galvanometer in a Wheatstone bridge circuit to provide a means of measuring the ground resistance. Since the galvanometer will not operate on ac, the synchronous vibrator has a second reed with spring contacts for rectifying the ac input into the galvanometer circuit to produce direct current for actuating the moving coil of the galvanometer.

This instrument is not affected by stray alternating or direct currents or by polarization of the electrodes. However, the dry batteries which provide the source of power are subject to replacement at intervals depending on the usage of the meter.

Groundohmer

The Groundohmer is a foreign manufactured instrument and is sold in this country by Herman H. Sticht Co., Inc. of New York City. It operates on the fall-of-potential principle and combines certain of the features of the "Megger" and the "Vibroground" instruments in that it employs a hand-operated magneto generator for the source of power and a modified Wheatstone bridge circuit for measuring the resistance of the ground.

Alternating current produced by the magneto generator passes through the primary winding of the transformer to the ground under test, then through the earth to the auxiliary current electrode and then back to the generator. The voltage drop between the ground under test and the potential electrode opposes the voltage in the circuit fed by the secondary of the transformer, and in which a balancing resistor or calibrated potentiometer is connected.

When the two voltages are equal in value, there will be no current flow between the test electrode and the balancing resistor. The pointer of the galvanometer will now indicate zero.

This condition is obtained by adjusting the calibrated dial of the resistor or potentiometer and the resistance of the ground is read directly from this dial.

The direct current required for actuating the galvanometer is obtained by means of a rectifier driven in synchronism with the magneto generator.

The reliability of the measurement is not influenced by the resistances of the auxiliary grounds because when the bridge is balanced no current flows through the potential electrode and,

(Please turn to page 42)

"Over-the-Horizon" Radio Tests

By HARVEY N. MISENHEIMER*

Until recently, reliable radio transmission in the ultra-high-frequency range and higher was generally assumed possible only on line-of-sight paths. The few instances of good reception at distances beyond the horizon were considered to be "freaks." As transmitting powers were increased and larger antennas came into use, such hitherto unreliable reception occurred more frequently and interest was aroused in the possibility of reliable over-the-horizon transmission. Bell Laboratories scientists have investigated the field for some years and have proved that reliable transmission is possible. To provide information on long-term performance, continuous tests of over-the-horizon transmission were made in Newfoundland for a full year.

RADIO TRANSMISSION at the frequencies employed for FM and television broadcasting was, until recently, generally considered reliable only where a line-of-sight path existed between transmitter and receiver. This restriction was thought to apply even more strongly to the higher frequencies (UHF and SHF) used in radio-relay systems.

It is true that strong signals are occasionally received at these frequencies over paths extending well beyond the horizon. However, with the testing techniques employed earlier, these transmissions were not found to be suitable for providing dependable communications.

During the past few years, higher transmitting powers and larger antennas have become available and the increased reliability that has resulted from their use on over-the-horizon paths has aroused considerable interest.

Long-term measurements of UHF and SHF over-the-horizon transmissions have shown that for distances of 100 to 300 miles, the median (middle value) received signal levels are only 50 to 90 db below the intensity expected at such distances in free space;† this is hundreds of decibels higher than the spherical-earth diffraction theory would predict.

In the autumn of 1952, a need arose for a radio-relay communication system in an area where the terrain presented serious operating difficulties. It was realized that if the requirements for this communication system could be met through the use of over-the-horizon methods there would be very substantial cost advantages over a line-of-sight relay system, and that more reliable communications might result.

A comprehensive test program was undertaken to confirm the reliability of over-the-horizon transmission. The purpose was broader than simply answering the immediate question—it was to determine a basis for engineering radio-relay systems involving over-the-horizon links, with particular reference to systems that are installed in the northern latitudes.

Newfoundland was chosen as the test area, and testing equipment was installed at St. Anthony, Gander, and Harbour Main *(Fig. 1)*. The two receiving antennas used at Gander are shown in the headpiece.

Tests were conducted from October 1953 to October 1954, providing wide variations in both weather and transmission conditions. This extensive program was carried out by the Laboratories and the Bell Telephone Co. of Canada, in collaboration with the U. S. Air Force.

*This article is reprinted from the February, 1956, *Bell Laboratories Record*. Mr. Misenheimer received his B.S. degree from Coe College in 1925, after service in the Navy in World War I and two years in the Merchant Marine as a radio operator. His M.S. degree was received from New York University in 1935. He joined the Department of Development and Research of the AT&T company in 1925, where he took part in the early development of overseas radio transmitters and systems. This work continued after his transfer to the Bell Telephone Laboratories in 1934. Mr. Misenheimer was on military leave with the Army from 1941 through 1945 and is now a colonel in the Signal Corps reserve. Upon returning to the Laboratories, he resumed work on overseas radio problems for a time. More recently he has been engaged in cost and performance studies of radio-relay systems.

†*Bell Laboratories Record*, June 1952, page 245.

Fig. 1. Map showing paths of over-the-horizon tests conducted in Newfoundland.

At the time the tests were begun, available information on over-the-horizon propagation consisted of little more than a few dozen short-term measurements collected from various sources. These measurements indicated that at distances of 100 and 200 miles the median path losses were greater by about 55 and 73 db, respectively, than the losses expected in free space.

This provided a rough basis for estimating median values of path loss as it varies with path length. However, there was no adequate basis for estimating the variation in path loss with frequency or with the season of the year. Also, very little was known about how propagation would be affected by periods of fog, rain, or snow.

The two test paths in Newfoundland were about 170 and 290 miles long. Frequencies of 505 and 4,090 mc were used. Unmodulated carriers were transmitted and continuous graphical records were made of the received signal.

Good results were obtained at both frequencies over the 170-mile path, and at the 505-mc frequency over both paths. At 4,090 mc, the transmitter power and antenna gains were insufficient to provide a continuously useful signal over the 290-mile path.

On both test paths, the long-term median signal levels at 505 mc were very close to the values that had been expected. The ranges of signal variation, with regard to both long-term and rapid fading, were also in good agreement with expected values.

The principal information obtained from the tests has to do with long-term variations in the received signal level *(Fig. 2)*. The monthly medians of the hourly medians are plotted in terms of received signal referred to the signal that would be received if the paths were located in free space.

The 505-mc observations over the longer path did not begin until June, but it appears very likely that the full year performance would have paralleled that observed for the 170-mile path.

A second and closely-related group of information obtained from the tests is illustrated by the curves of *Fig. 3*. These curves are cumulative distributions of the hourly median signals received at 505 mc over the 170-mile path. They show the percentages of the time that the hourly median signal was greater than particular values. In such a distribution, the value that is exceeded exactly 50 per cent of the time is the median value.

Similar information was obtained for 505-mc transmission over the 290-mile path and for 4,090-mc transmission over the 170-mile path.

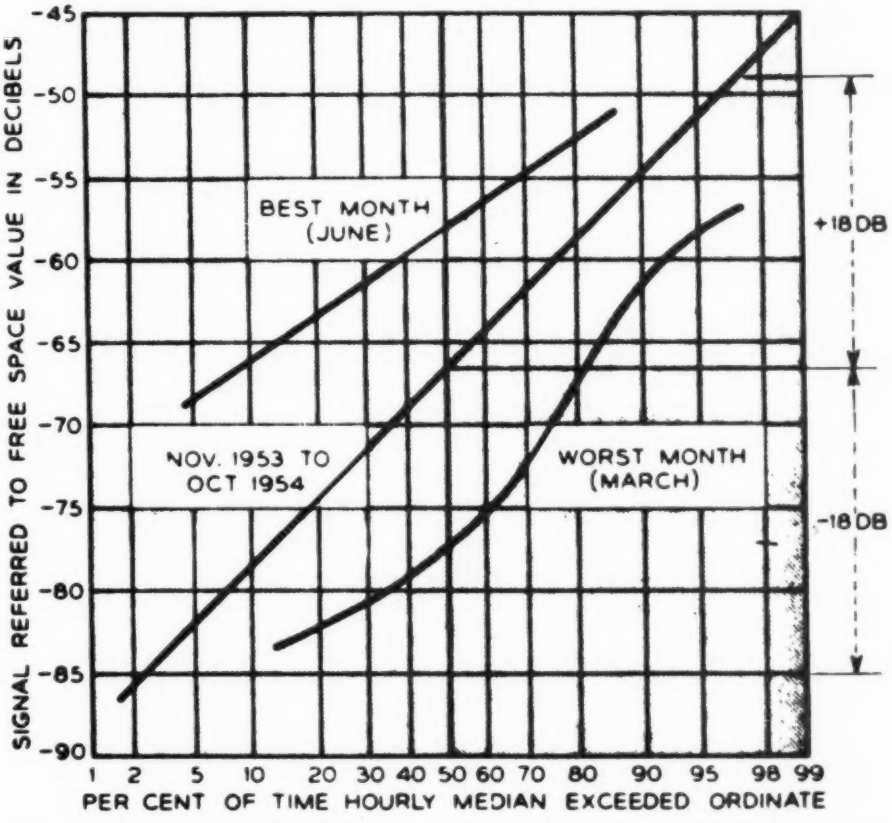

Fig. 3. Comparison of 505-mc transmission carried on in Newfoundland during the best and worst months with that for the entire year.

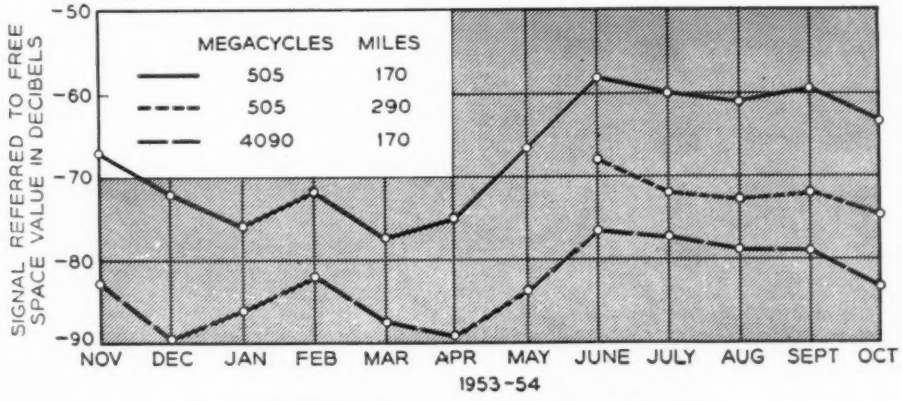

Fig. 2. Comparison of the received signal levels.

Comparison of the 505-mc results with earlier data shows that the results of the Newfoundland tests conform to expectations in the following respects:

(1) For transmission over the 170-mile path, the average level of received signal was 65 to 70 db below that for free space. (2) Transmission over the 290-mile path was about 12 db poorer relative to free space than transmission over the 170-mile path. (3) The range of hourly median values for the full year was such that 95 per cent of them were within about plus or minus

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18 db and were equally distributed about the median value.

Fig. 2 also supplies new information concerning the long-term variation of average signal levels with the season and with the frequency. In particular, it shows the 505-mc signal to be about 15 db stronger in the summer and fall, when temperature and humidity are high, than in the winter and spring (the minor rise in February accompanied minor increases in temperature and humidity).

It also shows that the 4,090-mc signal varied in the same general manner, although the signal was 10 to 18 db weaker and did not vary as much between seasons. Part of this reduction in the 4,090-mc median signal level is due to reduced antenna effectiveness on over-the-horizon paths in comparison with that realized from the same antennas on line-of-sight paths.

Fig. 3 shows the amplitude distribution of the comparatively slow variations in the received signal. The Nov. 1953 to Oct. 1954 curve exhibits a normal distribution, in which losses more than x db greater than the median value and losses more than x db less than the median value are equally likely.

It is characteristic of over-the-horizon propagation that practically continuous rapid fading is superimposed on the slow variations. Over short intervals of time, the distribution of instantaneous signal amplitudes in this rapid fading is not symmetrical but approximates a "Rayleigh" distribution; this means that signal levels differing from the median by more than a given amount are downward fades more often than upward swings.

It was found in the tests that the depth or magnitude of rapid fading showed no significant variation with the time of day and very little with the season of the year.

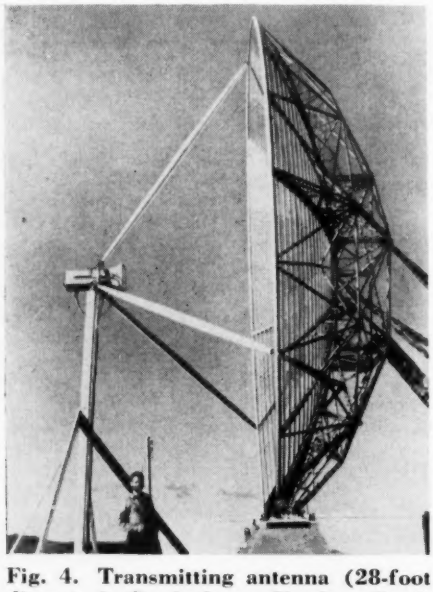

Fig. 4. Transmitting antenna (28-foot diameter), St. Anthony, Newfoundland.

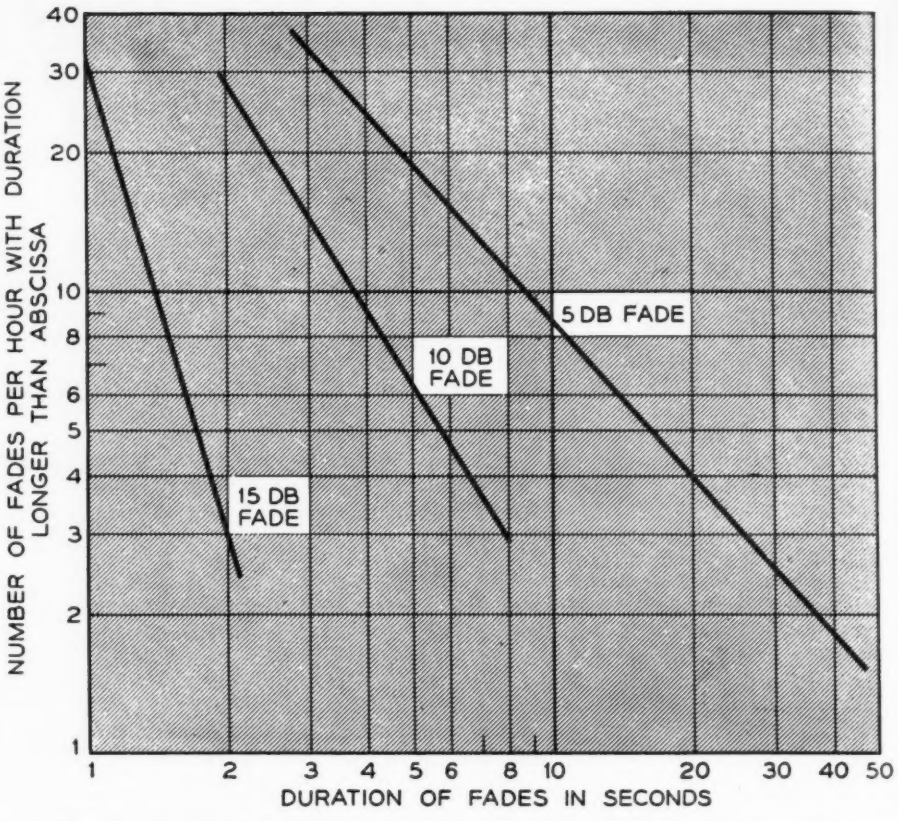

Fig. 5. Characteristics of the rapid fading observed in the 505-mc tests.

Fig. 6. Some of the receiving and recording equipment used in the year-long over-the-horizon tests.

Typical data on rapid fading were obtained from high-speed graphic records of the 505-mc signal received over the 170-mile path *(Fig. 5)*. The curves give the number of fades per hour that were more than 5, 10, and 15 db below the hourly median level and lasted longer than the time intervals shown on the abscissa scale. They indicate, for example, that in a typical hour about 32 fades exceeded 15 db in depth and lasted longer than one second. Of these, only three lasted longer than two seconds. At 4,090 mc, fast fading was about eight times faster than it was at 505 mc.

The numerical data on long-term medians, slow variations, and fast fading are needed so that adequate transmission margins can be engineered into a communications system. When the seasonal variation of monthly medians and the comparatively slow variation of hourly medians combine to produce a low signal, the superimposed rapid fading can cause momentary fades down into the noise level unless the transmission margin is found to be ample.

However, the required margin can be reduced considerably by the use of space diversity in reception.

Space diversity can be achieved by receiving a signal simultaneously on two or more antennas spaced many wavelengths apart, using a separate receiver for each antenna, and combining the outputs to obtain the strongest instantaneous received signal.

Use of this technique in over-the-horizon systems does not materially affect long-term signal variations, but is useful in reducing the effective range of the rapid fading.

Results of the space-diversity tests, which were a part of the test program, showed that substantially the full theo-

(Please turn to page 38)

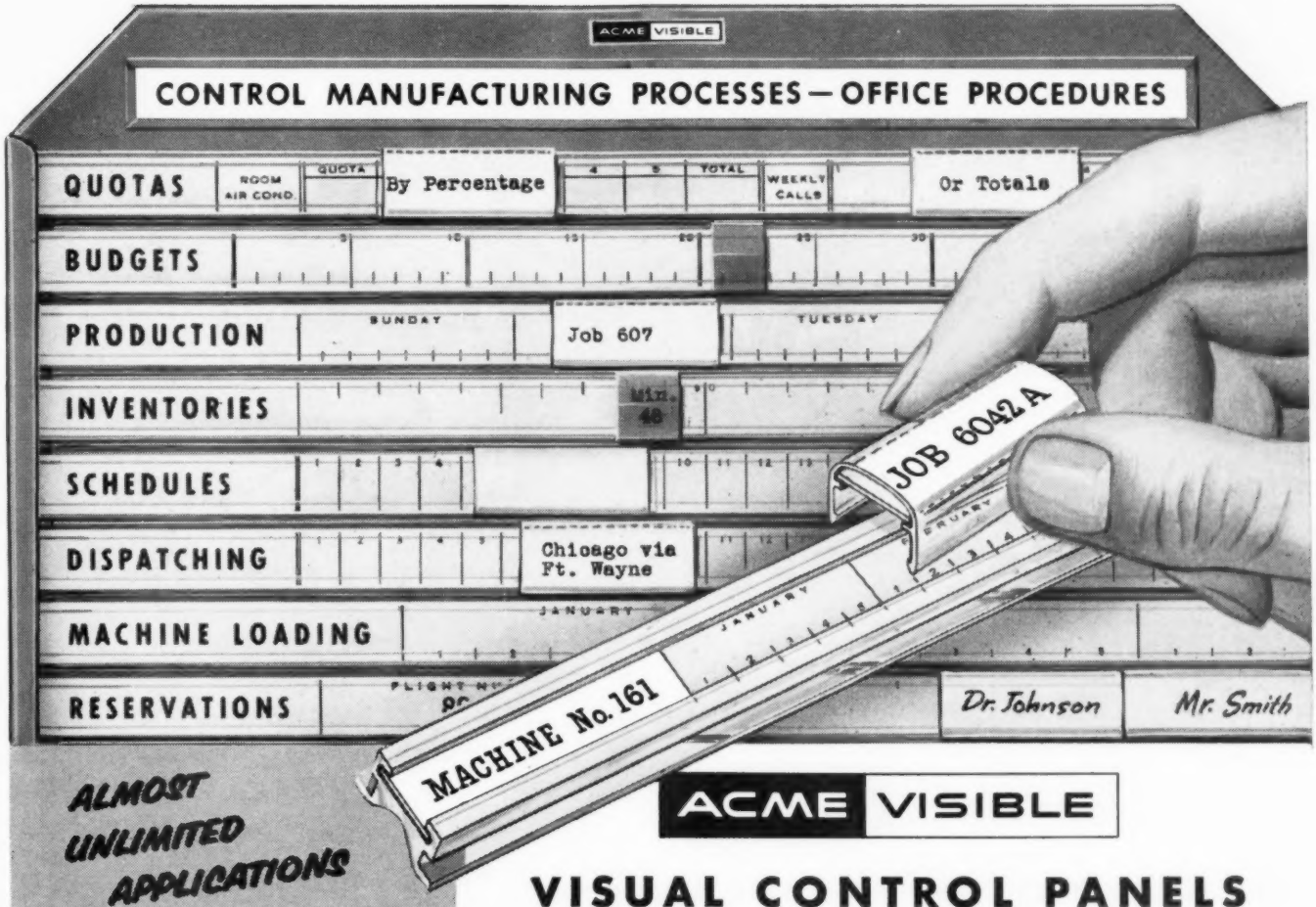

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Chart Action, Indicate Trends, Show Results, Permit Comparison, Picture Organized Facts for Analysis and Decision.

Complete flexibility with limitless signalling and charting possibilities . . . Easily adapted to your individual record requirements.

Lightweight panels contain clear plastic tubes which are individually removable and may be shifted from one position to another . . . Clarity of tube provides full legibility of contents.

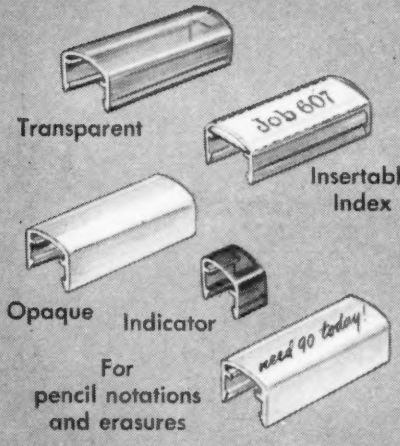
Signals snap on or off at any point . . . Hold position until positively moved . . . Slide smoothly back and forth . . . By-pass freely.

Insertable index feature afford triple signalling potential: by position, by color and by legend of index.

Ask the man from Acme to show you examples—

ALMOST UNLIMITED APPLICATIONS

OVER-RIDING SIGNALS



TUBE INTERIOR SIGNALS

Panels Contain 25, 50 or 100 Tubes Available in 17, 30, and 40 inch widths

ACME VISIBLE RECORDS, INC. CROZET, VIRGINIA

T8-4-56

☐ Send us more information on Visual Control Panels.

☐ We are interested in Acme Visible equipment for _____ records.
KIND OF RECORD

☐ Have representative call. Date _____ Time _____

Company _____ Attention _____

Address _____

City _____ Zone _____ State _____

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Section 19
PBX Service Notes

The following notes outline the usual reasons for and causes of poor grades of service. Suggestions are given as to what might be done to eliminate the causes and better the service.

(1) *Signals Plugged Out.* There are many reasons why PBX trunk signals should not be plugged out before the attendant is ready to answer them:

When the attendant plugs out an incoming trunk signal, the ringing signal can no longer be heard, the customer thinks something has gone wrong with his call and hangs up and tries again or abandons the call.

On most incoming long distance station-to-station calls, the toll operator times by cord signal and the calling party is charged for the call even though he may hang up before the attendant answers. As operator and customer toll dialing expands, there will be more and more overcharging, if the attendant continues to plug out signals.

On an incoming call from a paystation, if the attendant plugs out the call and the calling party hangs up, his deposit is automatically collected even though he doesn't get his party. This is also true of incoming calls from hotels. The hotel attendant does not monitor on calls to the outside to see if the called party answers. She writes up the charge ticket at the start of the call. In this case the guest pays for a call on which he does not talk.

The attendant doubles her operating work when a plug out causes the party to call more than once. Too, a plug in the jack prevents a non-busy attendant from answering the call.

CAUSE A. *Attendant doesn't have key in talking position when plugging into jack.*

CORRECTION—Operate the talking key before answering signal.

CAUSE B. *Failure to speak immediately upon plugging in.*

CORRECTION—Attendant should be sure she is ready to speak when taking up signal.

(2) *Slow Answers.* Slow answers to incoming trunk signals give the calling party the impression of discourtesy and inefficiency on the part of the attendant and the company she works for.

The caller sometimes does not wait and the call is lost, also the sale that might have been connected with the call.

A slow answer uses expensive equipment inefficiently.

CAUSE A. *Inattention.*

CORRECTION—Check the ventilation, heating and lighting conditions—if improperly maintained they could cause drowsiness. Personal calls are a menace to fast service. See that the attendant's load is correct. A non-busy operator's reaction is slow.

CAUSE B. *Eyes off board unnecessarily.*

CORRECTION—See that timing and reference material is within easy reach of attendant. If attendant is not kept busy her eyes will wander—her mind, too.

CAUSE C. *Signals plugged out.*

CORRECTION—A slower-downer of the worst sort.

CAUSE D. *Failure to overlap properly.*

CORRECTION—Develop attendant's ability to overlap. Make sure that attendants understand that any action which delays an immediate attempt to complete a call is not an overlap operation.

CAUSE E. *Improper use of buzzer key.*

CORRECTION—Does attendant turn buzzer key on after turning it off when board is busy? Does she check to see buzzer key is on when she turns to do other work?

CAUSE F. *Poor location or condition of records.*

CORRECTION—Are all records attendant uses accurate, complete, legible, conveniently located and easily usable?

CAUSE G. *Extension user's practices.*

CORRECTION—Does the attendant recognize the whole effect which extension user's habits have on the general over-all service given at the switchboard? Arrange for such instructions as extension users might need.

CAUSE H. *Slow or false motions in establishing connections.*

CORRECTION—Give instructions and drills as are required in the technique of handling cords, keys, pencils and in locating numbers in the multiple.

CAUSE I. *Allowing signals to become hidden by tickets or other material.*

CORRECTION—Arrange to have tickets of standard size and see that ticket holders and ticket bins are provided as needed. Suggest that attendant keep all material not needed for operating off the key shelf. See that suitable places are provided for attendants' pocketbooks while they are at the switchboard.

CAUSE J. *Dim lamp caps.*

CORRECTION—Report dim signals promptly to "Repair Service." Check operating room lighting conditions.

CAUSE K. *Overloaded condition.*

CORRECTION—Review the force schedule to see that tricks provided and the distribution of lunch and relief periods meet the needs of the load. Analyze the work of each attendant and take anv necessary action to insure equal job production. Check attendant's other duties. If interfering with board operations, advise PBX management. Analyze equipment requirements to determine whether there are sufficient tie trunks, central office trunks, extension equipment and switchboard positions.

CAUSE L. *Answering and cutting out before calling party can give his order.*

CORRECTION—Attendant should be instructed that after answering a signal the order should be accepted and acknowledged and an immediate attempt made to complete the connection before cutting out.

(3) *Non-Identifying Answering Phrase.* A firm's name is its greatest asset. How the attendant uses this name in the answering phrase can promote customer friendship in a way no advertising could better. The good answering phrase gets the call off to a fine start.

A non-identifying phrase irritates the calling party and leaves the impression of laziness, lack of interest, and the "Why-did-you-bother-me?" feeling. It delays the completion of the call and consequently increases the operating time for handling the call.

The answering phrase can become one of the best advertising mediums a firm can establish.

CAUSE A. *Lack of appreciation of the importance of an identifying phrase.*

CORRECTION—Suggest good answering phrases to the attendant. Sell her on the importance of this initial meeting with the calling party. If possible, arrange for her to practice identifying phrase on tape recorder. Have her note differences in various answering phrases.

CAUSE B. *Failure to have key operated to talking position and calling party getting only part of phrase.*

CORRECTION—See Item (1) — "Signals Plugged Out."

(Section 19 to be continued next week)

Toll Billing—1956 style

Low-cost Recordak Junior Microfilmer cuts billing time 45% for more than 200 telephone companies using this unique system.

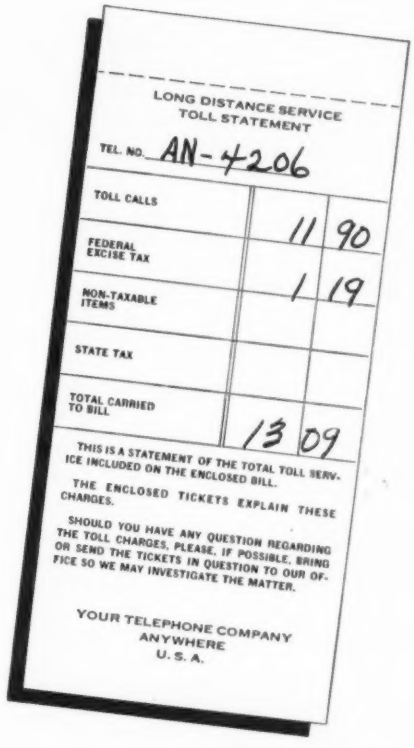
5 entries or less per bill

No matter how many toll calls a subscriber makes—the bill will look like this.

Just posting the totals does the trick because the toll tickets are microfilmed and sent out with the bill. Transcription of detail information from each toll ticket to bill is eliminated.

This cuts billing time 45% or more. Subscribers welcome the complete information provided by the original toll ticket for each call. The company retains a complete, compact photographic record of all bills rendered.

All you need is a Recordak Microfilmer which you can rent for as little as $17.50 per month; or buy for as little as $550. Write for detailed information and copies of actual case histories.


LONG DISTANCE SERVICE
TOLL STATEMENT

TEL. NO. AN-4206

TOLL CALLS	11 90
FEDERAL EXCISE TAX	1 19
NON-TAXABLE ITEMS	
STATE TAX	
TOTAL CARRIED TO BILL	13 09

THIS IS A STATEMENT OF THE TOTAL TOLL SERVICE INCLUDED ON THE ENCLOSED BILL.

THE ENCLOSED TICKETS EXPLAIN THESE CHARGES.

SHOULD YOU HAVE ANY QUESTION REGARDING THE TOLL CHARGES, PLEASE, IF POSSIBLE, BRING OR SEND THE TICKETS IN QUESTION TO OUR OFFICE SO WE MAY INVESTIGATE THE MATTER.

YOUR TELEPHONE COMPANY
ANYWHERE
U. S. A.

RECORDAK

(Subsidiary of Eastman Kodak Company)

originator of modern microfilming —and its application to telephone routines

"Recordak" is a trade-mark

MAIL COUPON FOR FREE FOLDER

RECORDAK CORPORATION, (*Subsidiary of Eastman Kodak Company*)
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Please send folder describing Recordak Toll Billing System in detail. HH-8

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Subscribers react enthusiastically to Automatic's new Type 80 Monophone.

It's "*Orchids*" to YOU!

When you install Type 80 Monophones, you can expect some mighty nice compliments. Many telephone men are hearing heart-warming comments like:

- "It's such a smart, *modern-looking* telephone. Why, it really 'does something' for the room it's in."
- "I've never heard a telephone that sounded so clear. And we're out on a farm where we get a lot of hum and static."
- "When that telephone rings we always hear it—even out in the yard. Yet, its ring is pleasant and not too loud when you're indoors."
- "I think this telephone is easier to dial. Seems like those arrowheads pointing to the numbers help a lot."
- "I was glad to see the new telephone is so easy to lift and carry. That bigger grip makes it easier to lift."

Later on, your subscribers will also appreciate Type 80's remarkable freedom from trouble—and you'll approve its low maintenance cost. Automatic's experienced design, manufacture, and quality control insure unparalleled dependability. Order Type 80's today. Address: *Automatic Electric Sales Corporation, 1033 W. Van Buren, Chicago 7. Or call HAymarket 1-4300.*

Type 80 Monophone—the Telephone you designed

AUTOMATIC ELECTRIC

ORIGINATORS OF THE DIAL TELEPHONE

From a
grateful
subscriber

THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITOR

WE RECEIVED the following interesting letter from Mr. O. Ramsaur, communications engineer for the Pennsylvania Power & Light Co., Allentown, in which he states his views on the use of plastic pipe in water systems and its effects when used for electrical grounding. He says:

"In response to your invitation for readers' reactions (TELEPHONY, June 9, 1956, p. 28), this is to say that we heartily agree with Warner T. Smith, of REA:

"(1) That 'safety of the telephone user and prevention of fires . . . are the most important reasons for grounding protectors.'

"(2) That 'common grounding is the most effective way . . .' It stands to reason that the better the ground, the better all purposes are served; and that the common ground not only is better than either of separate grounds, but eliminates the differences of potential that can and do exist between separate grounding systems. You summed it up nicely in your answer to the second question in your *Plant Man's Quiz* for Feb. 4, 1956.

"The larger power utilities have long recognized these principles and have practiced them. My company in particular was one of the early pioneers some 35 years ago of the multigrounded common-neutral distribution system. It has saved untold grief in several ways.

"In more recent years, certain of the Bell Telephone systems are following suit to the extent of grounding protectors to the same water piping to which we ground our power neutrals. Still more recently, Bell requested and readily obtained a code revision allowing them to ground their protectors directly to the outdoor meter case wherever it is not convenient to ground to the water pipe (see paragraph 8041-b5 of NEC).

"If our support of the proposal to revise the National Electrical Code will help the cause, you and Mr. Smith are assured that we will be glad to do all we can. In fact, I have no doubt but that the Edison Electric Institute itself will support the common ground wholeheartedly.

"I suggest that Mr. Smith send me copies of the proposed revision, for review by our distribution engineer, who is a member of the EEI Transmission and Distribution Committee, our safety engineer, and myself. Meanwhile, it might be well to send copies of the revisions and the letter you published directly to the Edison Electric Institute."

•

Our long-time friend, Herman Wagner, manager of the Prattsburg (N.Y.) Telephone Co., Inc., issues a single-fold, four-page pamphlet each month titled: "Telephone Service News." This publication is furnished the subscribers and from every indication it appears to be doing a great public relations job.

A recent issue pictured and described a dial switching unit, ringing generators, main frame and cable spinner. A brief description of each item and how it is used is presented in an interesting manner. The number of calls completed each hour over one switching system is also enumerated.

Certainly this action should cause subscribers to take a greater interest in their telephone service and help the operating company considerably by understanding more about it.

•

The changing of automobile license plates is a job which we never enjoy. Usually, the old bolts rust and have to be cut; then new ones must be obtained before the new plates can be installed. We understand that there is a move under way to have the plates of all states, Canada and Mexico, standardized as to size and shape.

If this action is approved, it will undoubtedly make it possible for the manufacturers of automobiles to provide a slot on the car so that the plates may merely be slipped in place and the use of bolts will not be necessary. In our opinion, this will be a worth-while improvement.

•

The other day we noticed a picture of a sparrow which had built its nest on top of the pay telephone in an outdoor-type booth. Now we don't blame the sparrow for it certainly used good judgment in picking such a fine location for a home, but, naturally, this does not contribute to good telephone housekeeping.

We have noticed that most outdoor type booths are efficient dirt catchers. This is especially true of the floor—often found covered with dirt, twigs or paper. Such a condition is to be understood when we observe that the door is open on most booths of this type except when the telephone is actually in use.

We wonder why the booth is not equipped with an automatic door closer so that it is kept closed except when someone opens the door to enter or leave the booth. Certainly this arrangement would make it a much easier task to keep the booths clean and free of debris.

•

When we visited Kodiak, Alaska recently, John and Martha Cushing, who own and operate the Kodiak Telephone Co., informed us that they have had numerous requests for colored telephones even in that far north country.

Strange as it may seem, their first requests came from all of the bars in town. And we do mean "bars" where refreshments are served and not "bears" which are also famous in that region.

•

Featuring the 24th annual safe driving award dinner of the Lincoln (Neb.) Kiwanis Club recently was the awarding of 77 certificates for no-accident records to members of the Lincoln Telephone & Telegraph Co. This was the largest representation among the many firms participating.

Arthur T. Albers, Arthur C. King and Fred M. Strasser were among the seven individuals who had attained recognition for 24 years of no-accident driving.

We believe that this is positive proof that Independent telephone people are safety-minded and practice it constantly.

THE CASE OF THE "PART-TIME" PAYSTATION

The telephone company in San Angelo, Texas, wondered why a certain outdoor paystation wasn't paying as well as they expected. Seemed it wasn't "working" 'round the clock, because passers-by couldn't spot it at night.

So, a dome light was added, and the average monthly revenue jumped from $16.65 to an encouraging $34.90! The company then decided to make the booth even easier to see, and installed a spotlight. Result: the average monthly revenue hit **$50!**

Autelco Paystations in attractive booths, well-marked and BRIGHTLY LIGHTED, are bringing in handsome revenue to companies from coast-to-coast. They could be doing the same for you! Get started right —ask for our Survey Simplifier today. Address:
Automatic Electric Sales Corporation, 1033 W. Van Buren St., Chicago 7. Or call HAymarket 1-4300.

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Courts and Commissions

Ind. Company Asks OK To Purchase Another

The Indiana Public Service Commission received on July 10 an application for purchase of the Monroe County Telephone Co. by the Smithville Telephone Co.

Byron Draper recently created the Smithville Telephone Co. by combining the Smithville, Clear Creek and Stanford exchanges. They were modernized and extended after the company was given two federal loans.

The suggested transaction would include the Monroe County company's Ellettsville exchange facilities in Monroe, Morgan, Owen and Green counties.

In connection with the proposed purchase the Smithville company asked commission authority to borrow $337,000 from the federal govenment and proposed to rebuild both its own Gosport exchange and the Ellettsville exchange after buying the latter from Monroe County.

New rate schedules were proposed for Gosport and Ellettsville, under which users would pay $5.50 for residence one-party lines; $4.50 for four-party; $10 for one-party business lines, and $8.00 for two-party business.

Nebraska Company Granted Increase in Rates

The Indianola Telephone Co. has been given authority by the Nebraska Railway Commission to increase net rates effective with the conversion of its exchange to automatic service (TELEPHONY, Jan. 21, p. 30). The following increases were granted:

	Old	*New*
One-party business	$4.25	$7.50
Two-party business	None	6.00
One-party residence	3.25	5.00
Two-party residence	2.75	4.50
Four-party residence	2.25	4.00
Rural residence	2.85	4.50
Rural business	3.35	5.50
Switchers (service station)	1.00	1.50
Paystation (local call)	.05	.10

Under the new rates, the company's operating revenue will be an estimated $24,254.16 and expenses $17,466.84. This will result in a net profit of $6,787.32 before interest and dividend, or a rate of return of 5.25 per cent upon an adjusted rate base of $129,289.23, which includes an amount for cash working capital, material and supplies.

The company serves 395 subscribers at Indianola.

Neb. Commission OKs Denial Of Service upon Misuse

The Lincoln Telephone & Telegraph Co. was authorized on July 17 by the Nebraska Railway Commission to discontinue or deny service in cases of misuse or fraudulent use of service (TELEPHONY, July 28, p. 34).

Such use is defined in the company's revised tariff as including "the use of service or facilities of the telephone company to transmit a message, or to locate a person, or otherwise to give or obtain information, without the payment of a message toll charge."

The commission also ordered that all cases of misuse or abuse be referred to the general commercial superintendent of the company and that no discontinuance or denial of service be made without his authorization.

Ill. Commission Approves Raises for Two Companies

The Illinois Commerce Commission has authorized the following companies to increase rates:

Fieldon Telephone Co., effective Aug. 1.

	No. of Stations	*Old*	*New*
One-party business	5	$1.50	$4.00
Two-party business	—	—	3.75
Rural multi-party business	—	—	3.50
One-party residence	5	1.50	3.50
Four-party residence	11	1.50	3.25
Rural multi-party residence	16	1.50	3.25

Hutsonville Telephone Co., effective July 1.

One-party business	34	4.25	6.00
Rural multi-party business	11	2.75	3.75
One-party residence	132	2.75	3.75
Four-party residence	17	2.25	3.00
Rural multi-party residence	238	2.50	3.00

FCC Examiner Recommends Sale of Ill. Company to Bell

Federal Communications Commission Examiner Annie Neal Huntting on July 16 recommended the granting of an application of Illinois Bell Telephone Co. to acquire telephone properties of Payson (Ill.) Farmers Telephone Co. (TELEPHONY, Feb. 25, p. 36).

Her initial decision will become effective unless an appeal is taken to the commission or the commission reviews the recommendations on its own motion.

Illinois Commission Grants Raise to Independent

An increase in rates for telephone subscribers in the Cornell area will be in effect in the near future following an order of the Illinois Commerce Commission granting the raise to the Cornell Community Telephone Co., it was reported on July 13.

The order provides for a rate increase amounting to $1,020. The company serves some 348 customers.

Illinois Companies Ask to Sell, Adjust Rates

The Illinois Commerce Commission on July 27 was to hear the application of the Piasa Telephone Co. to sell to the Chesterfield-Medora Telephone Co.

The Woodhill Community Telephone Co. filed with the commission on July 5, application for a rate adjustment.

Ill. Company Asks Raise

Woodhull Telephone Co. has filed application with the Illinois Commerce Commission to increase rates, to amount to a total of about $5,000, it was reported on July 12.

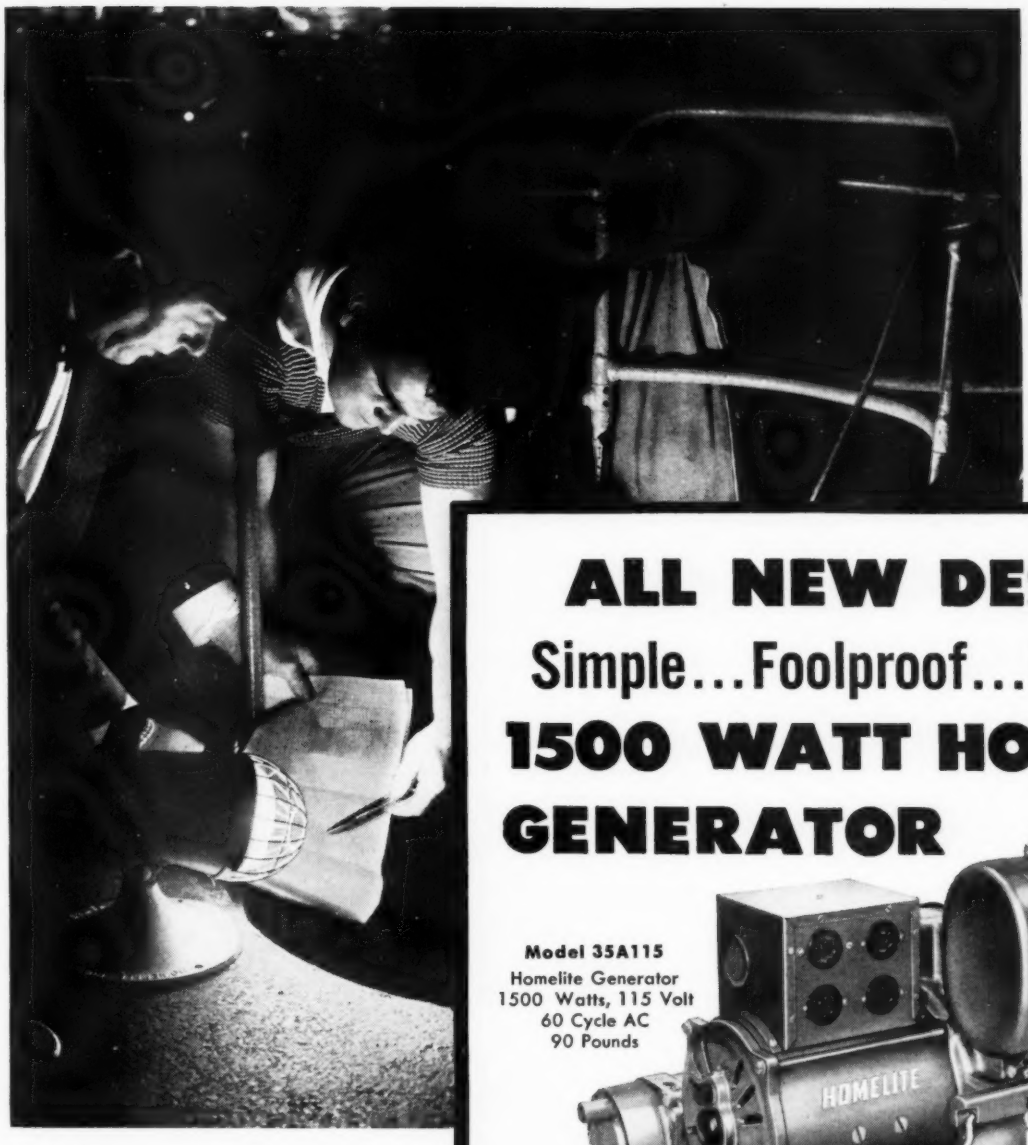
Wis. Company Seeks Raise

The Public Service Commission of Wisconsin on August 1 was to hear the application of the Waunakee Telephone Co. for authority to increase rates.

Ala. Company to Borrow

The Southland Telephone Co. operating at Camden, Atmore and Thomas-

(Please turn to page 35)



ALL NEW DESIGN!

Simple...Foolproof...Low Cost

1500 WATT HOMELITE GENERATOR

Model 35A115
Homelite Generator
1500 Watts, 115 Volt
60 Cycle AC
90 Pounds

Easy to Carry... ...Easy to Use

1. New Money-Saving Features . . . No DC brushes; just two easy-to-get-at collector ring brushes . . . No commutator or DC windings . . . No intermediate couplings; armature keys directly to shaft. Fewer parts to wear out — longer trouble-free generator service.

2. Constant Voltage . . . less than 4% change from no load to full 1500 watt capacity . . . assures long service life for your electric tools . . . guarantees top performance at all times.

3. Overload Capacity . . . 1500 watt continuous duty with generous overload capacity prevents tool stalling under heavy loads . . . insures uninterrupted service even when starting loads exceed operating loads.

4. Compact and Lightweight . . . one man can easily carry this generator wherever you need electricity to power time-saving electric tools. No need for long, hazardous power-consuming cables.

Whatever tools you want to operate — electric soldering irons, drills, floodlights, grinders, hammers, the new Homelite 35A115 generator can save you money. For a free demonstration or additional information, call your nearest Homelite representative.

SAVE EVEN MORE! New Homelite electronic idle control unit, available as optional accessory, runs engine at idle speed when no current is drawn . . . automatically brings engine to full speed when load is applied.

Ask your Homelite representative to show you how this easily-installed accessory reduces engine wear . . . increases service life . . . cuts fuel consumption.

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construction and maintenance DIGEST

- **Protect sub-stations**
- **Coiled in color**
- **Good cable "adds up"**
- **25-year battery**
- **Save 3 ways**

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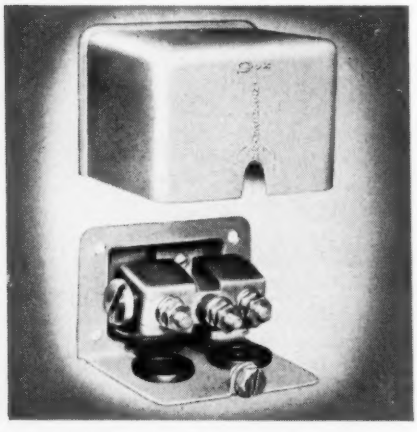
Two dividends are yours when you order supplies from Stromberg-Carlson. First, you get the protection of a double guarantee—ours and the maker's. This assures you of getting the finest products, backed by our 62-year reputation. Second, your support is used to further the art of telephony. We're knee-deep in this industry as a full-time job, not a side line, and your supply business plays a big part and helps us continue our research for new and better telephone equipment.

The new Cook "Interceptor"

Lower Maintenance Costs—Sounds good, and it is! It's the new "Interceptor," a fuseless sub-station protector made by Cook Electric Company.

The "Interceptor" contains a Bakelite unit having heavy Everdur bussed circuits and ground studs, insert-moulded. It is compact and employs the protection characteristics of the Mini-Gap carbon-to-carbon arrester. There are two



"Interceptor" fuseless sub-station protector

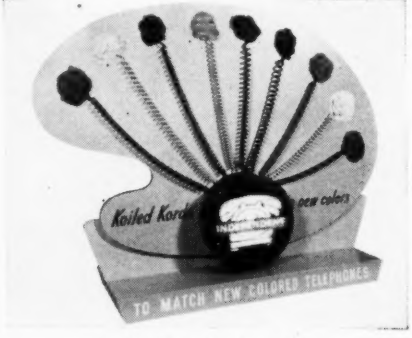
Mini-Gaps used and they will pass, simultaneously, a current of 30 amperes for 15 minutes without destruction in accordance with Underwriters' requirements.

Order from your Stromberg-Carlson representative.

Retractile cords now in black or color

There's extra revenue in Koiled Kords* retractile cords—the spring-like telephone cords that curl up neatly instead of dangling noose-like from the telephone.

Neoprene jacketed, they fit all types and makes of telephones, and



Available in black or color.

last indefinitely under severe service conditions. Extend to about 5 times their retracted length and return to their original neat coil when released.

Tinsel conductors provide maximum flexibility.

Neoprene outer jacket is smooth, clean, attractive, reduces cord trouble to a minimum.

Cannot fray and is unharmed by perspiration, humidity, oil, water, grease or acid.

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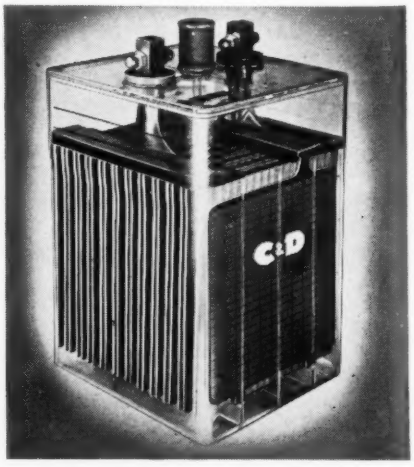
Copper Wire + Paper Insulating Tape + Lead-Antimony Sheath + Accuracy in every detail adds up to—Kennecott Telephone Cable

Accuracy in every manufacturing process is the reason Kennecott Telephone Cable is of high quality. Careful manufacture—attention to the minutest details—result in dependable, long-lasting cable performance.

Battery will still have its pep when 1980 rolls around

It will last 25 years—in full float service! That's the life expectancy of C & D's PlastiCal (lead-calcium grids) telephone battery.

You get this extra-long, trouble-free operation because C & D Batteries, Inc. use an exclusive suspended and supported plate construction.



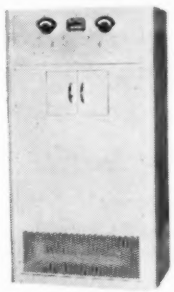
In full float service, this telephone battery stays on the job a quarter of a century.

Illustrated here is a typical C & D telephone battery with a 660 A.H. capacity. When ordering this 25-year battery, specify PCE-660.

When you find that a 14-year expectancy meets your needs, you can get dependable operation from a C & D PlastiCell (high-tensile lead alloy grids) battery. For a PlastiCell with capacity of 660 A.H., specify CE-23.

Battery charger pays for itself, saves 3 ways

If you're interested in saving money, and still keeping up a good supply of battery power, here is real help for you. It's the Flotrol three-phase automatic constant voltage battery charger manufactured by Lorain Products Corporation.



Charger provides constant voltage, no moving parts.

You save power. Whether charging current is heavy or light, the Flotrol maintains an exceptionally high efficiency. For example—even as low as 10% of its rated load, the Flotrol operates at 50% efficiency! Often, power savings pay the full cost of the Flotrol.

You save maintenance. With no moving parts, you don't have to lubricate or replace any worn components. You simply install the Flotrol and forget it.

You save your batteries, too. By providing a constant voltage, the Flotrol keeps your batteries fully charged, yet prevents overcharging. If a heavy overload is placed on the Flotrol, the output current is limited to a value which will not damage the battery or the Flotrol.

Easy to install, too. Just move the cabinet into position, and make five connections at conveniently located terminals (3 AC power leads, 2 DC charging leads).

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ton, was given authority to borrow $160,000 by the Alabama Public Service Commission, it was reported recently. The money is to be used "to bring telephone facilities up to a high quality standard of service."

Four Minnesota Companies Granted Rate Relief

Minnesota Railroad & Warehouse Commission has recently approved schedules of increased rates for four Independents — the Rothsay Telephone Co. (an REA loan recipient) on July 9; the Farmers & Merchants Telephone Co., Lanesboro, on July 16; the Midwest Telephone Co., Parkers Prairie, on July 17, and the Marshall County Telephone Co., Minneapolis, on July 19.

In the Rothsay rate order, the commission noted that the company has an REA loan allocation of $247,000 to be used to convert the system to automatic operation and for rehabilitation. The Rothsay company has negotiated to purchase all of its present switching stations. Its plans now contemplate an increase in company-owned stations from 245 to 470, and an increase in investment per station from $101 to $540.

Operating revenues for the Rothsay company are expected to rise from $10,491 to $32,015, and net operating income from $360 to $8,062, a 3.13 per cent return on a plant fair value of $257,733. Present gross and approved net rates are as follows:

	Old	*New*
Business:		
One-party	$4.50	$8.00
Two-party	3.75	7.00
Rural multi-party	—	7.00
Residence:		
One-party	3.50	5.50
Two-party	3.00	4.50
Four-party	2.50	3.75
Rural multi-party, metallic	3.00	5.00
Rural multi-party grounded	2.25	—

The Farmers & Merchants company's new rates will raise total operating revenues from $19,562 to $21,780, and net operating income from $743 to $2,086, a 5.56 per cent return on a rate base of $37,535. Old and new rates are:

	Old	*New*
Business:		
One-party	$4.25	$4.75
Two-party	3.75	4.25
Residence:		
One-party	2.50	2.90
Two-party	—	2.60
Four-party	2.00	2.25
Switching service	.75	1.00

The company serves approximately 389 local stations and furnishes switching service for 208.

The commission observed that the Midwest company is contemplating borrowing $70,000 from the Minnesota Mutual Life Insurance Co. to complete its rehabilitation program, and that the loan is contingent upon the company's showing a reasonable return on its present operations.

Interim rates authorized for the Midwest company will increase net operating revenues to $40,764 from $35,161, and net income to $9,232 from $5,802, a 5.22 per cent return on a $176,811 plant fair value. Rates effective upon completion of the rehabilitation will produce revenues of $48,292, net income of $12,986 and a 5.73 per cent return on plant fair value of $226,732. The company served 417 local, 400 rural and 151 service stations, as of Apr. 1.

Marshall County Telephone Co., serving 1,887 local, 953 rural, and 144 service stations, as of Dec. 31, 1955, secured approval of rates which are calculated to raise operating revenues from $167,047 to $188,296, and net income from $31,523 to $41,624, a 4.15 per cent return on a plant fair value of $1,002,216. Old and new rates are:

	Old	*New*
Alvarado and Kennedy exchanges:		
Business:		
One-party	$5.50	$6.60
Two-party	4.75	5.70
Rural multi-party	4.00	4.80
Residence:		
One-party	3.25	3.75
Two-party	2.75	3.15
Four-party	2.25	2.60
Rural multi-party	3.50	4.05
Argyle and Stephen exchanges:		
Business:		
One-party	5.75	6.90
Two-party	5.00	6.00
Rural multi-party	4.25	5.10
Residence:		
One-party	3.50	4.05
Two-party	3.00	3.45
Four-party	2.50	2.90
Rural multi-party	3.75	4.35
Service switching station (Stephen)	1.00	1.25
Hallock and Warren exchanges:		
Business:		
One-party	6.50	7.80
Two-party	5.50	6.60
Rural multi-party	4.50	5.40
Residence:		
One-party	4.00	4.60
Two-party	3.50	4.05
Four-party	2.50	3.15
Rural multi-party	3.75	4.35
Public and semi-public service (all exchanges):		
Exch. completed local message	.05 per call	.10 per call
Colored handset (all exchanges):		
Two-tone instrument (installation charge)		5.00

Ohio Commission Grants Authority to Issue Stock

The Ohio Public Service Commission on July 17 granted authority to the Sycamore Telephone Co. to sell 1,278 shares of its common capital stock with a par value of $100 per

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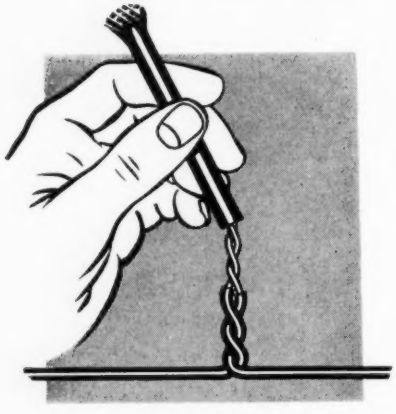

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share, a total of $127,800, proceeds of which are to be used for capital expenditures to reimburse the company's treasury.

The company has a balance of uncapitalized capitalizable expenditures in the amount of $127,817.32.

Ga. Commission OKs Loans, Rates, Orders Consolidation

The Georgia Public Service Commission July 12 heard the application of Camden Telephone & Telegraph Co., Inc., for authority to increase rates for service. The rates authorized for the company are:

	Kingsland St. Marys	*Woodbine*
One-party business	$6.25	$5.50
Two-party business	5.25	4.50
Four-party business	4.25	3.50
One-party residence	4.00	3.50
Two-party residence	3.25	2.75
Four-party residence	2.75	2.25
Rural multi-party:		
Business	4.25	3.75
Residence	3.25	2.75
Paystations	6.25	5.50

The commission on July 12 authorized the company to borrow $650,000 from the Rural Electrification Administration, and to issue 1,000 shares of no par value common stock with a total declared value of $125,000.

*

The Georgia commission on July 11 authorized the Alma Telephone Co. to borrow from J. D. Riechard an amount not exceeding $40,000, bearing interest at the rate of 4 per cent and repayable in 10 equal installments.

The commission also ordered the owners of three companies: the Alma company (L. L. Bennett and J. G. Bennett); the Nichols Telephone Co. (J. G. Bennett), and the Patterson Telephone Co. (L. L. Bennett) to immediately consolidate the three companies into one by incorporation or otherwise.

Missouri Companies Ask to Buy and Issue Stock

The following hearings have been scheduled before the Missouri Public Service Commission:

Marion Rural Telephone Co., to operate exchanges in Marion County and to purchase the exchange at Benbow—Aug. 2.

Hartville Telephone Co. to issue 500 shares of capital stock—Aug. 9.

La Belle Telephone Co., a corporation, on July 25 filed application to issue its 500 shares of capital stock without nominal or par value, and for a certificate of public convenience and necessity.

Mountain States T&T Gains Rate Increase in Wyoming

The Wyoming Public Service Commission on July 18 granted a rate increase to Mountain States Telephone & Telegraph Co., but chopped off 12.9 per cent of the company's request (TELEPHONY, Apr. 7, p. 29).

The commission fixed the company's rate of return at 6.65 per cent on a net investment rate base to allow annual net earnings of $232,684. The company had requested rate increases that would have allowed a 6.84 per cent return rate and annual net earnings of $267,000.

In filing its request and a revised tariff sheet on Mar. 20, the company said its rate of return for the current year would be reduced to 5.38 per cent by attrition. Rate changes were asked for local and general exchange service and for message toll service at all company exchanges in Wyoming. No increase was asked on rural rates.

The revised rates were to become effective last Apr. 20, but the commission postponed them and held a public hearing at which protests were made by the city of Cheyenne and others.

The new rates are designed to give the company a gross annual revenue increase of $490,584.

Southern Bell Loses Plea For Rate Raise in Miss.

Southern Bell Telephone & Telegraph Co. lost its plea on July 20 for an immediate 2.5 million-dollar rate increase in Mississippi (TELEPHONY, July 14, p. 35.) The Mississippi Public Service Commission, which refused the request, ordered a "full and complete" investigation of the company's rates.

Southern Bell had asked for permission to establish increased rates effective July 26 for both local and long distance calls, and the company is expected to go ahead with its plans by posting a bond with the commission, it is reported.

Under the 1956 utilities law, the company is permitted to post the bond and if the request is turned down by the commission after a hearing, the company must refund its additional charges to the customer.

The commission, in a unanimous decision, said it was "not convinced the proposed rates and charges are just and non-discriminatory" and the request was suspended for a period of not less than 90 days.

Missouri Company Sold

The Conception Junction (Mo.) Telephone Co. was recently purchased by

Mr. and Mrs. Richard Henry. Purchase was made from Mr. and Mrs. M. O. Morris (TELEPHONY, June 2, p. 37).

Pa. Commission Authorizes Sale of $1,000,000 Common

The Pennsylvania Public Utility Commission has authorized the Commonwealth Telephone Co., Dallas, to sell one million dollars worth of common stock to construct new facilities and make plant improvements, it was reported recently.

Most of the money will be used in the area served by two recently merged subsidiaries, the Community Telephone Co. and the Blakeslee & Fernridge Telephone Co., the report stated.

Arkansas Company Effects Dial Rates Upon Conversion

Conversion of the Arkansas Telephone Co.'s Clinton and Shirley exchanges to automatic operation on July 21 was followed by the application (effective Aug. 1) of new rates. They are as follows:

	Clinton	*Shirley*
One-party business	$6.50	$6.00
Rural business	5.25	—
One-party residence	4.60	4.00
Two-party residence	3.35	3.50
Four-party residence	2.75	2.75
Rural multi-party residence	3.00	3.00

Dallas Reid Appointed State Manager, Va. T&T

Dallas H. Reid, of the Virginia Telephone & Telegraph Co., has been promoted to the position of Virginia manager with headquarters in Charlottesville, it was announced recently by Duane T. Swanson, vice president and division manager. Mr. Reid, who was district plant superintendent in Front Royal, began his new duties on July 1.

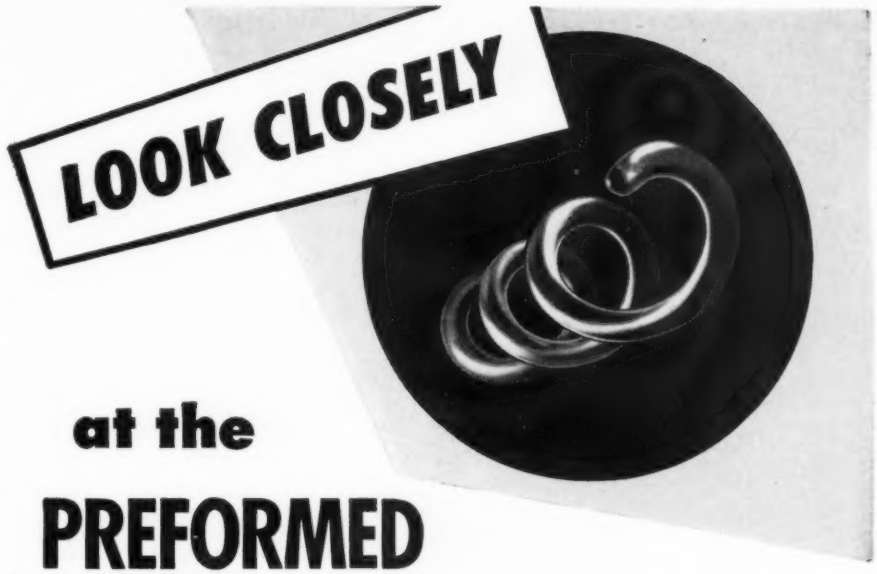
Mr. Reid started his telephone career in the company's northern district in 1946 upon his return from service with the U. S. Navy in the European and Asian theaters.

Washington Company Offers 170,000 Shares of Common

A syndicate headed by Blyth & Co., Inc., and including 36 other investment banking concerns, made a public offering recently of 170,000 shares of common stock ($10 par) of West Coast Telephone Co., Everett, Wash.

The price is $18 per share.

Proceeds from the sale of the new common stock will be used by the company to finance in part a continuing construction program.



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The Preformed method of producing line accessories is an exclusive new development for the telephone industry. It incorporates the use of Preformed Rods—helically formed within exacting tolerances—to serve varied "fitting" functions all along the line. No more bolts—no compression tools—simplified construction. More than just something new, Preformed Products represent a better, faster and more economical way to *dead-end, splice, support,* or *protect* conductors and strands.

For more information on their exclusive advantages, consult your telephone distributor.

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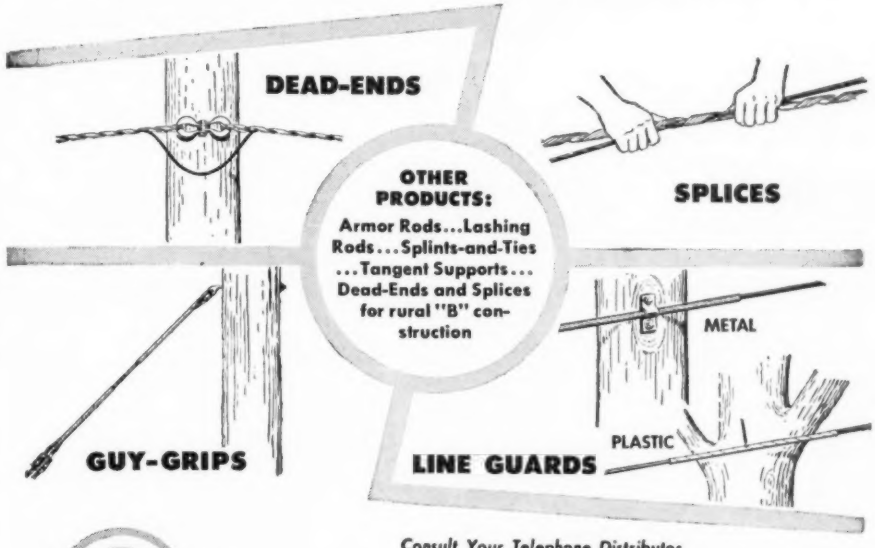

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for both regular and heavy-duty cutting

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And it's Klein again with a new, high leverage cutting plier for light- or heavy-gauge wire, including No. 2 weatherproof hard drawn solid copper wire, and A.C.S.R.

There's no extra hinging of any kind—no uncomfortable wide-spread handles—with this new Klein-Kut Plier. The offset hinge permits the extra-high leverage and operation is as smooth and easy as with any other Klein Plier. Forged from high-grade tool steel, individually fitted, tempered, adjusted and tested. Ask for No. 213-9 N.E. for streamlined pattern.

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OVER-THE-HORIZON RADIO TESTS

Continued from page 24

retical diversity improvement was realized at both test frequencies with a 200-foot antenna separation. In these tests, the better signal received through two antennas and associated receivers was chosen from instant to instant by automatic switching equipment.

The percentile signal strength (the value exceeded for all except 1 per cent of the time) with the diversity arrangement was approximately 10 db higher than the corresponding signal strength from a single receiver.

This is the improvement expected when two uncorrelated Rayleigh distributions are combined by switching-type diversity equipment.

Some effects of snow and fog for November through April are shown in *Fig. 7*. The collection and segregation of data for this purpose was undertaken because early in the tests it was observed that the signal levels seemed to be lower than usual during snowstorms yet higher than usual during conditions of fog.

The curves distinguish between the hourly periods of the 505-mc tests during which snowfall occurred and those when fog was present.

Curve A is a cumulative distribution that includes all the hourly median signal levels for the six-month period.

Curve B includes only those hours when snowfall was reported at the receiver site, and Curve C includes only the hours when fog was reported.

From the 50 per cent points on these curves it may be seen that the median signal was reduced about 4 db during hours of snowfall and increased about 6 db during hours of fog.

These effects are even more striking when weather observations at the transmitter site are included. The cumulative distributions of curves D and E include only the hours when snow and fog, respectively, were reported at both ends of the path.

Compared with the median signal for all hours, that for snowfall at both terminals shows a reduction in signal strength of about 6.5 db and that for fog at both terminals shows an increase of about 12 db.

There was some evidence of signal reduction during rainfall, but the effect was less pronounced than for snowfall.

The utility of these results lies in their providing a basis for engineering new communication systems using over-the-horizon radio links.

Specifying the transmission requirements and margins for such systems is essentially a matter of first determining the path loss to be expected over a particular route under the worst conditions and then determining a combination of transmitter powers, receiver band-widths, receiver noise figures, and

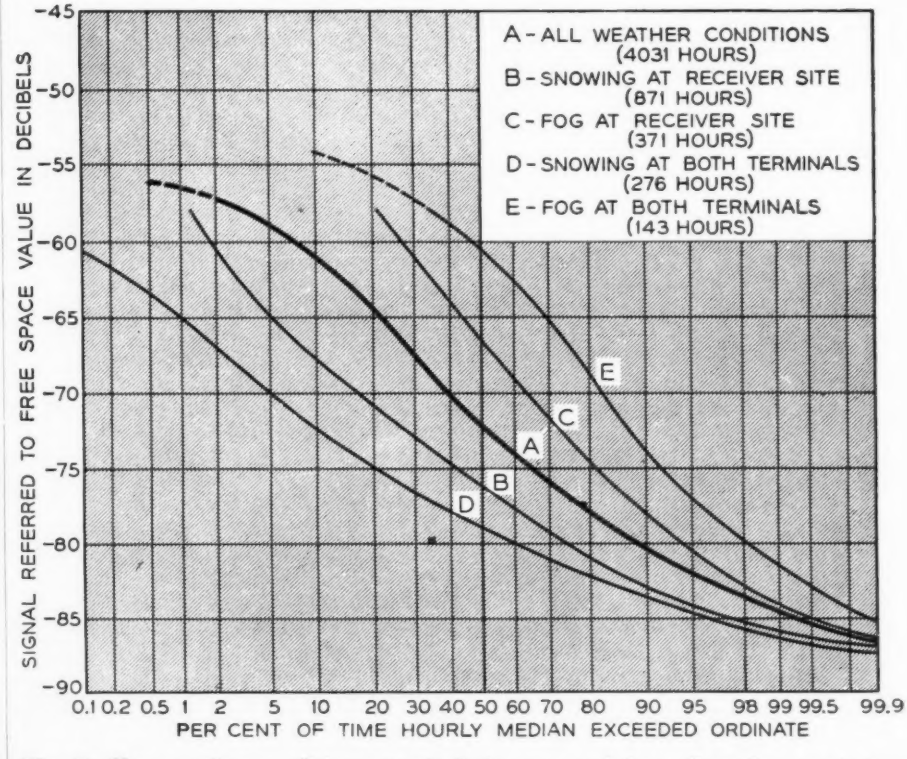

A - ALL WEATHER CONDITIONS (4031 HOURS)
B - SNOWING AT RECEIVER SITE (871 HOURS)
C - FOG AT RECEIVER SITE (371 HOURS)
D - SNOWING AT BOTH TERMINALS (276 HOURS)
E - FOG AT BOTH TERMINALS (143 HOURS)
SIGNAL REFERRED TO FREE SPACE VALUE IN DECIBELS
-45
-50
-55
-60
-65
-70
-75
-80
-85
-90
0.1 0.2 0.5 1 2 5 10 20 30 40 50 60 70 80 90 95 98 99 99.5 99.9
PER CENT OF TIME HOURLY MEDIAN EXCEEDED ORDINATE

Fig. 7. How weather conditions, particularly snow and fog, affected transmission.

antenna gains that will lead to acceptable performance.

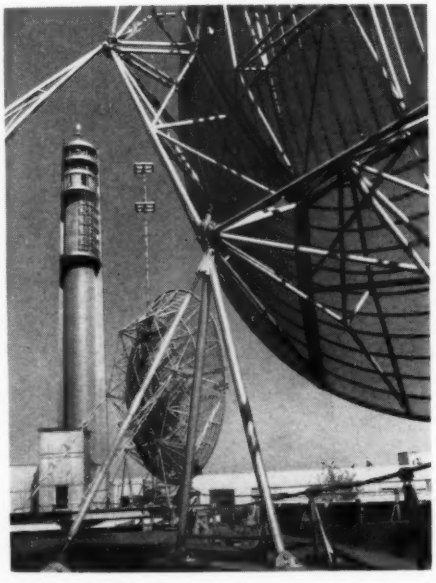
*

Editor's Note: Radio Corp. of Puerto Rico, a subsidiary of International Telephone & Telegraph Corp., and Federal Telecommunication Laboratories, a division of IT&T, also have been experimenting and progressing with over-the-horizon transmission links.

In December 1955, Fred B. Stauffer, writing for the *New York Herald Tribune*, said:

"Radio Corp. of Puerto Rico . . . has under way plans for the first commercial telephone application of microwave 'over-the-horizon' communication.

"The projected system will span the 237 over-water miles between San Juan,



Radio signals beamed from and received by antennas of the types shown above on the roof of Federal Telecommunication Laboratories, Nutley, N. J., have been spanning the 91 miles to Southampton, Long Island, in "over-the-horizon" microwave transmission.

Puerto Rico, and Ciudad Trujillo, Dominican Republic, without use of intermediate relay stations as is required with conventional 'line-of-sight' microwave widely used in overland communications. . . .

"Henri Busignies, executive vice president of Federal Telecommunication Laboratories, says many scientists have contributed to discoveries which are making possible commercial use of over-the-horizon microwaves.

"Noting that line-of-sight microwave systems have normal effective range of only 30 miles, Mr. Busignies said experimental use has been made for some time of the new equipment on a 95-mile link between the laboratories at Nutley, N. J., and Southampton, L. I.

"In its Puerto Rico-Dominican application, the new system is expected to

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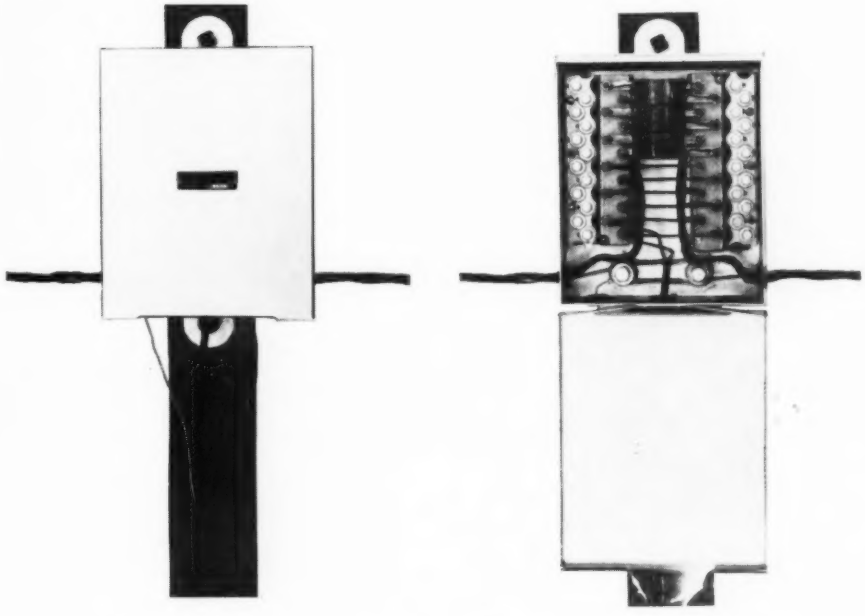
THE TYPE 177 Terminal Box

can be used for ▶ **CONNECTING**
PROTECTING
LOADING
TERMINATING



Designed to be used with the new rural distribution wire, the 177 terminal loading case is available in 8 types. Made from cast aluminum, this combination terminal box and housing for loading coils can be used protected or unprotected. The loading coils may be either 88 MH or 44 MH as required. Normally, 88 MH coils are used for the highest transmission efficiency. The loss using 88 MH coils is approximately 0.40 DB per mile. The loss using 44 MH coils is approximately 0.48 DB per mile. For further information, write us. We'll gladly answer any questions you may have.

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replace a single channel high frequency circuit and will provide six telephone communication channels in the 800-megacycle band.

"The sponsors believe the new system may be the missing link in efforts to establish intercontinental television.

"The essential difference between the over-the-horizon and standard line-of-sight systems is the utilization of what is known as 'scatter effects' in transmission. Because of the huge antennas and higher power used in the over-the-horizon method, some signals tend to fall out or scatter from the original line-of-sight path. This fall-out is recaptured at the desired point by new and larger receiving antennas."

A further statement on the IT&T organization's over-the-horizon progress was received by TELEPHONY on April 12 this year. IT&T's M. C. Poylo, staff assistant—product planning, reported:

"With respect to the Puerto Rico-Dominican Republic link mentioned in the newspaper article, progress has been made since the date of publication of Mr. Stauffer's story. Tests between the two terminals of the link have been conducted and their results indicate that satisfactory operation will be obtained when the commercial link is placed in operation.

"We should also like to inform you that there are a number of other projects active in the IT&T organization in conjunction with over-the-horizon propagation.

"Federal Telecommunication Laboratories are in the process of designing radio equipment for a link to be owned jointly by International Telephone & Telegraph Corp. and American Telephone & Telegraph Corp. and to be established between Florida and Cuba.

"This link, covering a distance of 185 miles, will be capable of handling one television channel and hundreds of telephone channels simultaneously in each direction. Frequency modulation is used with the radio band width of 20 Mc in the 600-900 Mc band. Sixty-foot diameter antennas, 10-kilowatt klystron amplifiers, and low-noise receivers will be used. Diversity reception will also be used.

"In addition to this project, IT&T is also taking steps to install a six-channel over-the-horizon radio-telephone link between the islands of Sardinia (Italy) and the islands of Minorca (Spain). This link will at first operate at a power of 500 watts and will carry six telephone channels in both directions.

"Finally, International Standard Electric Co., a subsidiary of IT&T, has received an order from NATO for a system of over-the-horizon links to be installed in the northern part of Europe.

"The technical responsibilities for these links rests with Federal Telecommunication Laboratories.

"The FTL staff has in the recent past published a number of articles on the matter of over-the-horizon propagation. At the 1956 IRE Winter Convention, an article entitled 'A Broadband Over-the-Horizon Link from Florida to Cuba' was presented by Mr. R. T. Adams, and at the same convention another paper entitled 'An Over-the-Horizon Link Between Puerto Rico and the Dominican Republic' was presented by Mr. R. E. Gray.

"In addition to these recent papers by the FTL staff, *Electrical Communication*, the technical organ of IT&T, is planning to publish within a few weeks a special issue devoted to over-the-horizon propagation."

Mr. Poylo also listed the following papers devoted to over-the-horizon transmission:

	Originals
Clavier	Microwave Communication Beyond the Horizon
Clavier & Altovsky ..	Report on 1941 Tests
Altman	Beyond the Horizon Diversity Systems
Altman	Design Chart for Propagation Beyond the Horizon
	Reprints
Clara & Antinori ...	Sardinia-Minorca Link
Karl (Germany)	Radio Links, 30 to 10,000 Mcs
Altman & Sichak	Simplified Diversity for Beyond the Horizon
Altman, Gray, Kandoian & Sichak	900 Mc PTM

Hong Kong Company Adds 7,000 Telephones in 1955

The Hong Kong Telephone Co. added 7,000 new telephones to its system in 1955, a record number, and a greater number of applications are on hand, it was reported on July 16.

Three new automatic exchanges, containing 5,400, 1,000, and 400 lines, respectively, were put into service.

Although the company has under installation and on order equipment to supply service to an additional 20,000 subscribers, the demand for service has necessitated formulation of further major development projects, specifications for which are being prepared.

TWO TOP QUALITY
ELECTRIC LACING TWINES
FROM THE SAME SUPPLIER

THE LINEN THREAD CO., INC.
418 Grand Street, Paterson 1, N. J.
Boston 10 • Chicago 10 • San Francisco 5
Baltimore 3 • Philadelphia 6 • Gloucester

IN THE NATION'S CAPITAL

Concluded from page 19

more generating capacity, more gas pipelines? What country has the best and most utility service, within the means of a far greater proportion of its population, than in all the rest of the world? What kind of a system do they have for controlling the utility service in that country? (The answer is commission regulation, in the United States, if you have not already guessed.) What kind of a system do they have in the backward countries where much of the population cannot afford to patronize what miserable service is performed? (Write your own answers here.)

Has commission regulation ever been abolished, once established, in any state in the Union? How many states have it? Has it not been growing constantly? Would any state legislature ever seriously consider abolishing state regulation if it were now proposed? On the contrary, does the record not show that state commission regulation has been constantly growing in jurisdiction and importance every year in the last half-century? Is there any responsible official in any state or federal government post today, still in his right mind, who would suggest the abolition of commission regulation? (If so, name him.) Who are some of the prominent people who believe that commission regulation is a failure and has been generally discredited? (These names ought to constitute as handsome a collection as was ever assembled outside of a House Un-American Activities Committee.) Would the people of this country generally approve the abolition of commission regulation and the substitution of public ownership?

A few questions like these would quickly cut to the core the phony arguments of some doctrinaire reformers who don't really know who's on first or what makes the trains run on time.

Two Iowa Independents Complete Merger Plans

Negotiations have been completed for the merging of properties of the Cherry Grove Switch company with the Lime Springs (Iowa) Telephone Co.

C. C. Pearce of Riceville, president of the Lime Springs Telephone Co., and manager of the Farmers' Telephone Co., Riceville, was in charge of negotiations.

Strong Mind, Strong Back

"You have greatly ventured, but all must do so who would greatly win."—BYRON.

it's dated

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NEOPRENE JACKETED DROP WIRE

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We know that our dumbbell type neoprene jacketed drop wire will last. It's tested thoroughly through every manufacturing stage. The tough neoprene jacket resists abrasion, moisture, sunlight, oil, water. The insulation sticks tightly to the conductor. The dumbbell or figure eight shape makes the wire easy to split, makes a neat installation.

You, too, may know all this for sure by trying Alphaduct drop wire. And . . . by dating the wire we make it easy for you to prove to yourself that this is the most sensible drop wire investment you've ever made.

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WITH TIMESAVING

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Other GREENLEE tools for telephone work . . .

Do the job faster, better with high quality GREENLEE Car Bits for pole work . . . Electricians' Auger Bits of special design for electrical installation work . . . Bell Hangers' Drills of the "Feeler Bit" type . . . Expansive Bits for boring ½" to 4" holes . . . and GREENLEE Angle-Screw Drivers which eliminate pre-boring for angle-screw installations.

MACHINERY & TOOLS
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Get facts on timesaving Greenlee tools. Write Greenlee Tool Company, 2068 Columbia Ave., Rockford, Illinois.

MEASURING GROUND RESISTANCE

Continued from page 21

therefore, its resistance does not affect the reading.

A high resistance of the current electrode will affect the sensitivity but not the accuracy of the measurement. There is practically no bothersome interference from stray direct or alternating currents.

Three-Point Method

With this method, the resistance of the ground under test and the auxiliary electrodes are measured two at a time in series. This arrangement in schematic form is indicated in *Fig. 3* when

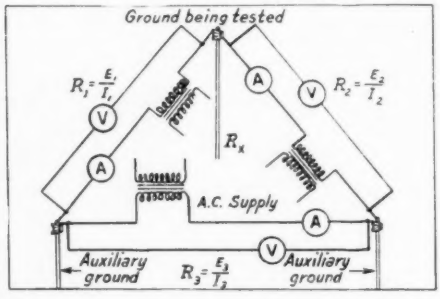

Fig. 3. Connections for three-point ac ammeter-voltmeter method of measuring ground resistances. $R_X = ½ (R_1 + R_2 - R_3)$.

used with alternating current. The connections are similar when using direct current except that the transformers are omitted.

A voltmeter and ammeter are used, and the three sets of connections shown must be made with readings of voltages and current taken in each case. After the three series measurements are made, the resistance of the ground under test may be calculated by the formula $R_X = ½ (R_1 + R_2 - R_3)$.

Stray direct currents in the earth have no effect when ac is used for the power supply, but if stray alternating current of the same frequency as the test current is present an error will be introduced because the stray current will affect the reading of the testing instruments.

When using direct current for the three-point method, the ground under test should be isolated as any other grounds on the circuit render the method ineffective because of cross currents. Stray alternating currents will not affect the measurement and the effect of stray direct currents can be eliminated by reversing the current, but only if the stray current remains constant.

Polarization is also a factor when direct current is used and the formation of gas at the electrodes may give a false indication. This condition may be corrected by taking two readings, reversing the current polarity. The current should be applied for short periods only or just long enough to obtain the readings.

It should also be understood that to obtain a fair degree of accuracy with the three-point method, the resistance of the auxiliary electrodes should be of the same order of magnitude as that of the electrode under test. Otherwise, small errors in the individual readings may result in a large error in the computed resistance.

Fall-of-Potential Method

This method of measuring ground resistance involves the passing of a known current through the electrode under test and one of the auxiliary electrodes. The drop in potential between the former and the second auxiliary

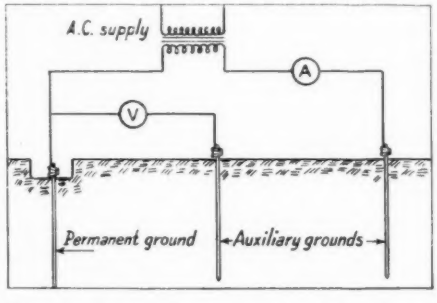

Fig. 4. Connections for the fall of potential method of measuring ground resistances.

electrode is then measured and the ratio of this voltage drop to the known current will indicate the resistance to ground.

The diagram of connections using alternating current for test is shown in *Fig. 4*. Alternating or direct current may be used for the fall-of-potential method and the ground resistance is determined from the current and voltage readings obtained with an ammeter and a voltmeter.

The use of this method with an ammeter and voltmeter is superior to the three-point method in that it requires only one set of readings and one calculation. In general, however, it is subject to the same objections as the three-point, ac and dc ammeter and voltmeter methods.

If a low-resistance voltmeter is used, as is usually the case with alternating current, the resistance of the auxiliary potential ground may result in considerable error.

However, by using a voltmeter with a high impedance, the resistance of the potential electrode will have no appre-

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ciable effect on the accuracy of the measurements.

The proper operation of ground connections, as with all other electrical equipment, is dependent largely on well-planned testing and maintenance. The resistance of a ground connection should be measured at the time of installation and this should be followed by check tests at regular intervals.

Usually, extreme accuracy or precision in ground measurement is not essential. In most cases, it is necessary only to know if the resistance is in the order of 10 ohms, 100 ohms or 1000 ohms. These values are indicative of whether the ground is satisfactory for the purpose intended or whether improvement is necessary.

Issues Charter to New Texas Cooperative

The Dell Telephone Co. Cooperative Inc. has been issued a charter by the Texas secretary of state, it was reported on June 16.

At the incorporation meeting held at Dell City, Jack Lynch was elected president. Other officers are John Gentry, vice president; Burt Brownfield, secretary; and Glenn C. Johnson, treasurer.

Directors are John Gailey and Allan Hill. Woodrow Bean is general counsel.

Obituaries

ARTHUR E. PETER, 53, manager of Western Line & Telephone Co., Liberal, Kan., died at his home on July 25 of a heart attack.

Survivors include a sister, Mrs. Esther Nash, Topeka.

*

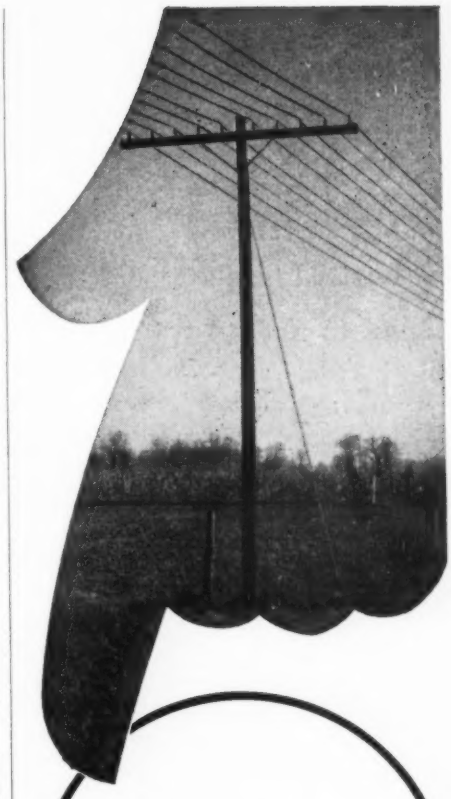
AS TELEPHONY went to press, news was received of the death of Col. C. W. Gottry, 57, vice president and general manager of the Missouri Telephone Co., Columbia, Mo., on July 28, of a heart attack. Col. Gottry had been in Minnesota on a fishing trip. Death occurred at the home of his brother, Frank P. Gottry, Pine City, Minn.

His widow and two daughters, Karen and Sandra, survive.

Col. Gottry was a director of the Missouri Telephone Association for many years, and was first president and organizer of the Theodore Gary Chapter of the Independent Telephone Pioneer Association, organized in 1946.

Constituents of Genius

"To think and to feel, constitute the two grand divisions of men of genius—the men of reasoning and the men of imagination."—ISAAC DISRAELI.



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The rugged tensile strength of *Crapo* HTL-135 and its heavy galvanized coating provide dependable and economical service life on typical rural lines.

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ADD COLOR IN
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SECONDS
To CONVERT a Stromberg-Carlson standard black 'phone to tu-tone, all you do is loosen one screw, remove the black housing, put on the colored housing and tighten the screw. Choice of 8 handsome colors.
Another profitable reason to standardize on Stromberg-Carlson telephones
Better today - better tomorrow!
Wouldn't you like to effect this kind of inventory saving in your company?
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Texas Telephone Companies Issue Booklet on Industry

J. B. Haley, executive secretary of the Texas Telephone Association, on July 25 announced the issuance of a 20-page book, "The Story of Texas' Telephone Industry — a Progress Report of the 300 Telephone Companies Serving Texas,"—the result of the combination of activities of both the Independents and Southwestern Bell Telephone Co. Mr. Haley stated:

"We are using a very comprehensive method of distribution through the local telephone people who, in turn, are distributing these books to their representatives in the Legislature, their schools, their newspapers, their service clubs and others who sometimes object to telephone operations and the rates."

Some of the subject headings are:

"295 Independent companies join hands with Bell to continue to improve and expand service."
"2½ million telephones serve Texas through 1,000 exchanges."
"Our size has *tripled* since 1946."
"Going dial—one reason our total plant investment continues to boom—now 85 per cent dial."
"Why telephone rates vary between companies and exchanges."
"Income taxes take over half of every dollar received from rate increases."
"A record of accomplishment."
"A bright future."

C&P Urges Telephone Use in Md. Home Planning Center

In order to encourage the use of telephones in newly constructed homes, and especially to emphasize the wisdom of advance planning of the wiring for such service, the Chesapeake & Potomac Telephone Co. is co-sponsoring in Baltimore the Maryland Home Planning Center. Opened June 25, the center was designed by Raymond Loewy Associates, and is being run with the cooperation of architect and builder organizations.

Occupying an area formerly devoted to a C&P business office, the exhibit features five detailed, fully landscaped scale models representing prize-winning home designs in an architectural competition sponsored by the company in cooperation with the Baltimore Chapter, American Institute of Architects.

Four complete rooms are reproduced full size. Although they are being used for meeting and exhibition purposes, they will be completely equipped and furnished as a kitchen, family room, study and teenager's bedroom respectively.

For example, the kitchen features a complete home communication center, including a hands-free speaker tele-

phone which operates without lifting the instrument, an inter-communication system connecting with telephones in other rooms, and a doorbell answering device which permits the housewife to answer a knock or ring at the front door from the kitchen or any other room where there is a telephone.

The company reports that it keeps telephone planning consultants on duty in the center.

Cooperating with the C&P company in sponsoring the exhibit are the Baltimore Chapter, American Institute of Architects; the Home Builders Association of Maryland; the National Plastic Products Co., and Saran Yarns Co. of Odenton; and the General Electric Supply Co., Baltimore division.

Explaining the purpose of the exhibit, C. A. Moore, manager of C&P's home planning service, said, "Maryland's Home Planning Center is being created to provide an authentic show place where the home owner or prospective builder may obtain up-to-the-minute information and ideas.

"It was for that reason that the telephone company invited outstanding organizations in the building, decorating and furnishing fields to cooperate in creating this center."

Pacific T&T Uses Archer For Rough Terrain

The *Chicago Tribune's* West Coast correspondent, Seymour Korman, on July 16 reported:

"In the remote bush-covered canyons of Orange County, Cal., the Pacific Telephone & Telegraph Co.'s crews had the problem of extending wires for telephone communications. Bob Lethin, a construction foreman, took a tip from Robin Hood. He engaged Bill McLain, proprietor of an archery shop.

McLain stood by a clifftop pole and shot at another pole, 400 rugged feet away. To his arrow was secured a light nylon line which fell neatly across the tops of scrub bush. The line was then fastened to a rope and the rope to telephone wire.

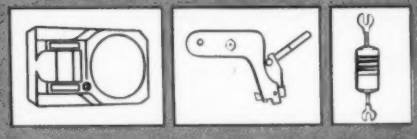
"Lethin's crew pulled the wire into place and attached it to the top of the poles. The process was repeated for succeeding jumps."

N. Y. Company Offers Bonds

W. E. Hutton & Co. and Laird, Bissell & Meeds have arranged the private sale of 1¼ million dollars of 4½ per cent debentures, series A, due May 1, 1981 for Chenango & Unadilla Telephone Corp., Norwich, N. Y. Also $250,000 of 4½ per cent convertible debentures, series B, due May 1, 1981.

IT'S EASY TO CONVERT TO

2-step operation



CONVERTING a "1400" or "1500" series telephone to 2-step operation requires a simple conversion kit: a housing, a lever assembly, and a capacitor. It takes just 8 minutes to make the change.

Another profitable reason to standardize on Stromberg-Carlson telephones

Better today - better tomorrow!

Don't you want to effect this kind of inventory saving in your operation?

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XUM

FWD Company Names Three District Sales Managers

Three new district sales managers, Robert N. Ashley, Glen Pate, and Robert J. Peterson, have been appointed by the Four Wheel Drive Auto Co., it was announced by G. F. DeCoursin, FWD vice president-sales.

R. M. ASHLEY

Mr. Ashley, headquartered at Denver, Colo., will supervise dealer sales of FWD's custom-engineered four and six-wheel-drive heavy-duty trucks in

R. J. PETERSON

Montana, Utah, Colorado, New Mexico and Wyoming.

Mr. Pate, whose headquarters are at FWD's Dallas branch, 1215 Dragon St., is district sales manager for north Texas, Oklahoma, Kansas, and western Missouri.

Mr. Peterson will handle the FWD sales territory of Washington, Oregon, Idaho, Alaska, and British Columbia, with headquarters at the Feenaughty Machinery Co., FWD dealer at 1028 Sixth Ave. South, Seattle, Wash.

IT&T Reports World Orders In Hand Totaling $14,000,000

In line with previously reported improving business conditions abroad, International Telephone & Telegraph Corp. announced on July 16 the receipt of recent orders indicative of the expansion of communication facilities in a number of widely scattered areas totaling more than 14 million dollars.

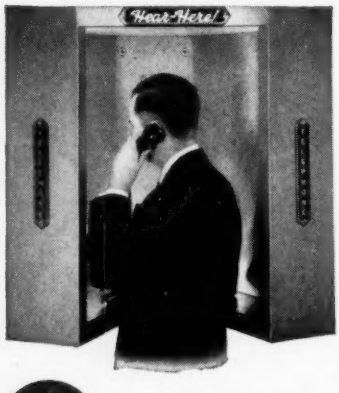
In Mexico, conversion of the telephone systems in the cities of Chihuahua, Torreon and Juarez from manual to automatic dial operation called for new central office equipment to serve 23,000 subscribers. The installation in Juarez will permit direct dialing across the border to El Paso, Tex.

In Egypt, the telephone administration has placed orders for 250 miles of coaxial cable. A six-core cable will handle 2,880 speech channels between Cairo and Alexandria, while a four-core secondary cable to Mansoura and Ismailia will accommodate 1,920 channels. The cables will be available for any future television developments.

In Argentina, under the plan for modernization of the national telephone system, an order for equipment for

Telephone in *Quiet!* with a **BURGESS-MANNING** *"Hear-Here"* Booth

More than "just a phone booth," every Burgess-Manning "HEAR-HERE" Booth is a room of "Quiet." They have been carefully studied from an acoustic standpoint and you will completely eliminate all interfering outside noise when you step inside. And notice too—



- No doors — always fresh air
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- No glass — to break

There's a model and size to fully satisfy your particular need. No other Booths like the Burgess-Manning.

Performance Guaranteed

Write for Catalog—Bulletin

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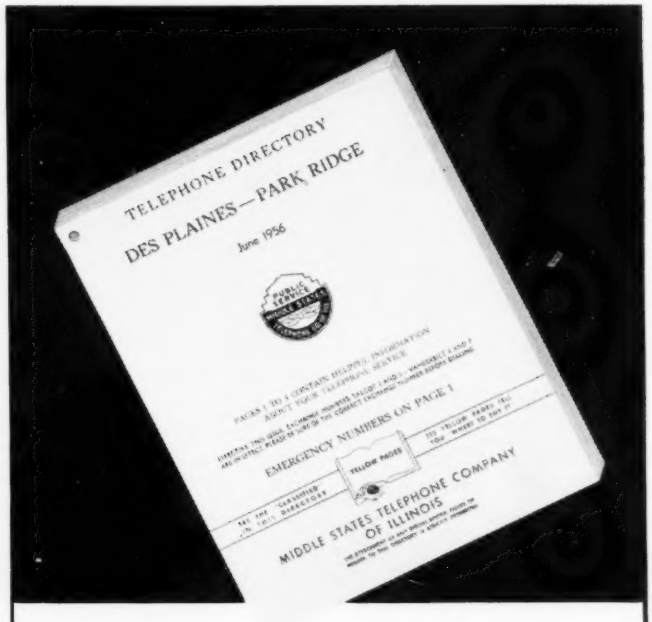


A directory for the

Middle States Telephone Company of Illinois

printed by

R. R. DONNELLEY & SONS COMPANY

350 East Twenty-second Street, Chicago 16

various exchanges includes the addition of 48,200 additional new lines to meet the growing demand for service.

In Peru, under a new program initiated as a result of a recently granted increase in rates by the Peruvian government, preliminary orders have been received for modern equipment to serve over 10,000 subscribers in a program that calls for an eventual addition of 38,200 lines of subscriber equipment.

The above are in addition to already-announced expansion programs in Puerto Rico, and Brazil, and all indications point to a steadily increasing demand for all forms of communication facilities throughout the free world.

Lueders to Head Telephone Sales for Holtzer-Cabot

The telephone equipment division of National Pneumatic Co., Inc., Boston, Mass., announces the appointment of Carl J. Lueders as manager, telephone equipment sales.

C. J. LUEDERS

Mr. Lueders joined the Holtzer-Cabot motor division in 1954 as a sales engineer, and prior to his new appointment was foreman in charge of telephone equipment production.

In his new post, Mr. Lueders will direct and supervise all sales activities for the extensive line of telephone equipment made for the Holtzer-Cabot division of National Pneumatic Co., Inc., including new products such as the "Mark VII" hand generator.

Correction

TELEPHONY, in its July 21, 1956 issue, page 58, interchanged the photos of C & D Batteries, Inc.'s Stanley J. Mahurin and Exide Industrial Division's J. J. Sullivan. The photo for C & D's Mr. Mahurin appears at the bottom of the third column and that for Exide's Mr. Sullivan appears in the second column on page 58.

CONTINUING IMPROVEMENTS IN THE

Murphy "ONE-MAN" Cable Tester

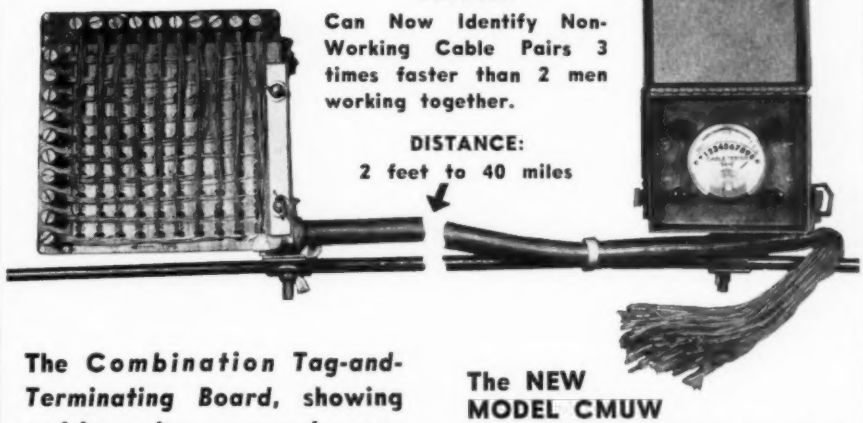
MODEL TTB

MODEL CMUW

ONE MAN WORKING ALONE

Can Now Identify Non-Working Cable Pairs 3 times faster than 2 men working together.

DISTANCE: 2 feet to 40 miles



The Combination Tag-and-Terminating Board, showing cable pairs properly connected. Tips — Horizontally, RINGS—Vertically.

The NEW MODEL CMUW

The new weatherproof gasket sealed case is now a part of every MODEL C shipped.

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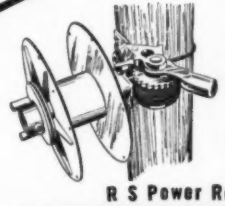
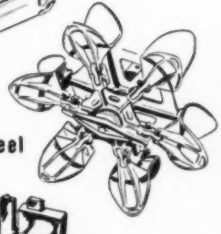
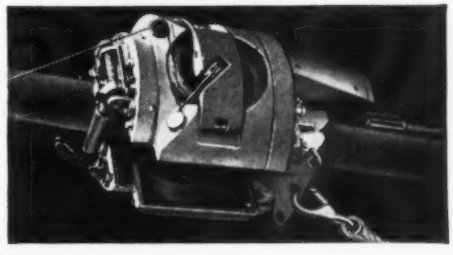
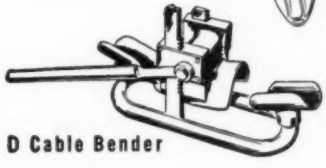


R S Power Reel



C R Power Reel





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line crews' EFFICIENCY
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LIGHTWEIGHT
Aluminum
SIMPLEX REEL JACK

Aluminum alloy housing reduces weight 21 pounds . . . full 10 ton lifting capacity maintained!

The new Simplex A1029 Reel Jack increases your men's efficiency by minimizing fatigue. Its lighter weight is a distinct advantage in loading, unloading and carrying to location, and its single-acting mechanism provides much easier lifting. Capacity 10 tons; weight 83 lbs. For reels up to 84" dia. Supplied with sturdy, laminated oak "T" base and 5' lever bar. Write today for full information.

Other SIMPLEX lightweight Leaders
A1538—Aluminum Pole Pulling & Straightening Jack; 15 tons cap., weight 63 lbs.
A1022—Aluminum Ratchet Lowering Jack for general lifting and lowering. Capacity 10 tons, weight 42 lbs.

Simplex LEVER · SCREW · HYDRAULIC Jacks
TEMPLETON, KENLY & CO.
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BROADVIEW, ILL.

Haley's
CEDAR POLES & FIR CROSS ARMS

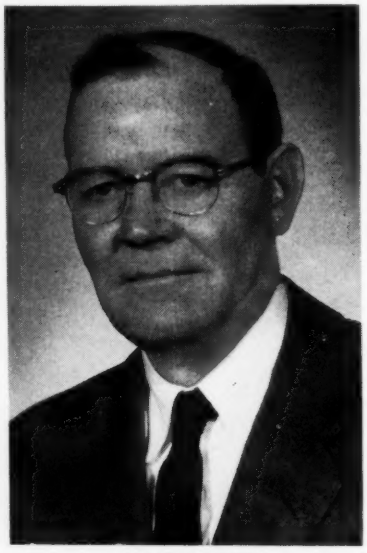
Light in weight and clean. PENTAchlorophenol treated in our modern plant for protection against decay, moisture and insect damage.

TWO strategically located yards:
MINNEAPOLIS, MINNESOTA
FINDLAY, OHIO

R. G. HALEY & CO.
SPITZER BLDG.
TOLEDO 4, OHIO

Announce General Telephone Directory Sales Managers

Wesley H. Loomis III, president of General Telephone Directory Co., announced that Roland T. Beard and Warren A. Rolph had been elected to the offices of vice president and eastern sales manager, and vice president and western sales manager respectively.



R. T. BEARD

W. A. ROLPH

Mr. Loomis also announced the appointments of William C. Glenn as division manager of the company's new division office at Columbia, Mo., and Marshall Smith as division manager of another new division office located in Durham. N, C.

Mr. Beard, former vice president and general manager of the Loomis Advertising Co., started his directory publishing career with the Loomis company in 1928 as an advertising salesman shortly after graduating from the School of Business at the University of Kansas. Mr. Beard, who for many years lived in Fort Wayne, Ind., will be located in Des Plaines, Ill.

W. C. GLENN

MARSHALL SMITH

Mr. Rolph, a graduate of Oregon State College, has been associated with the General Telephone Directory Co. since 1936 and was the general sales manager at the time of his recent promotion. From 1928 to 1936, Mr. Rolph was with General Telephone Co. of California. He will continue to be located in Des Plaines.

Mr. Glenn, a native of Missouri, receiving his education in that state, was formerly the sales training and promotion supervisor of the Loomis Advertising Co. and was located in Fort Wayne. Prior to his joining the Loomis company in 1950 he was in the directory department of the Southwestern Bell Telephone Co. at St. Louis for five years.

Mr. Smith was assistant division sales manager of the Long Beach, Cal. division at the time of his promotion. A native of Lexington, Ky., Mr. Smith

graduated from the School of Journalism at the University of Kentucky. For several years just prior to his joining General Telephone Directory Co. in 1950 as a unit sales supervisor in Kentucky, Mr. Smith was associated with the Delta Air Lines.

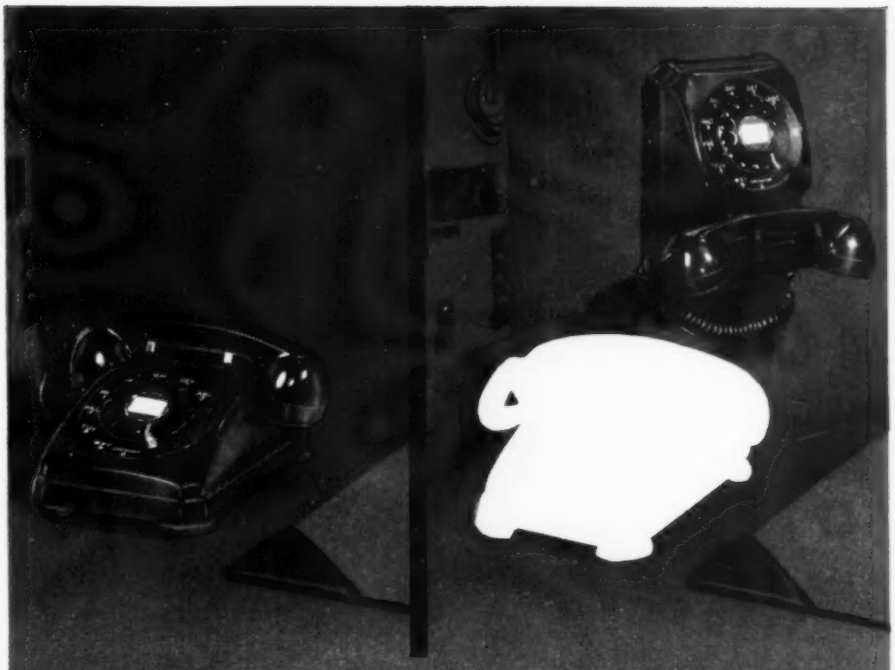
Mr. Loomis stated that the Columbia, Mo. division included the states of Missouri, Iowa, Kansas and Nebraska; whereas the Durham, N. C. division includes Virginia, West Virginia, North Carolina, South Carolina, Florida, Georgia, and Alabama.

Blaw-Knox Announces Four New Assignments

H. R. Loxterman was advanced to general sales manager, and Edward W. Pottmeyer to manager of engineering and development of the Blaw-Knox equipment division, Blaw-Knox Co., Pittsburgh, it was announced by A. H. Jackson, vice president and general manager of the division.

H. R. LOXTERMAN

E. W. POTTMEYER



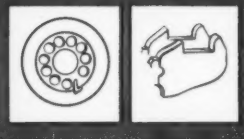
FROM DESK . . . TO WALL

IN

2

EASY

STEPS



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STROMBERG-CARLSON COMPANY

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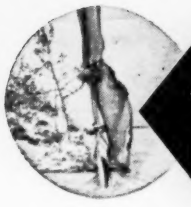

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NOW!
THE OVERTON
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WAY
ECONOMICALLY — EASILY

1. Slip Over Wire
2. Drive Home Nail
3. Attach Clamp

IT'S AS SIMPLE AS THAT!
Costs ⅓ less than Metal Guards and No Maintenance Problem

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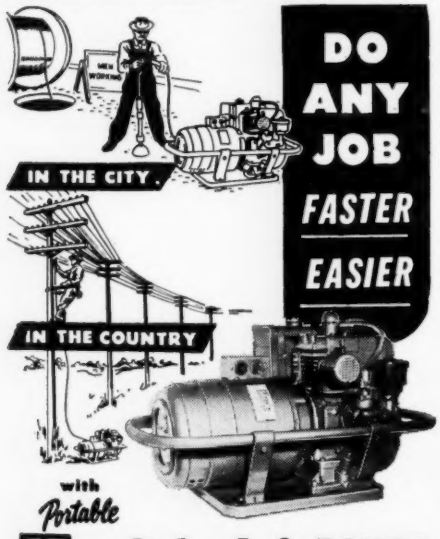
SEE YOUR JOBBER OR WRITE TO
S. E. OVERTON COMPANY
SOUTH HAVEN, MICHIGAN



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Katolight A.C. POWER

No matter where or what the job, a Katolight Portable Power Plant will simplify and speed up construction or maintenance work by supplying quick dependable electrical power right on the spot. Operates blowers, heaters, drills, hammers, saws, soldering irons other portable electrical tools and equipment. Eliminates power line hookups.
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IT'S NEW! SEND FOR FREE FOLDER ON NEW LIGHTWEIGHT PORTABLE MODELS

Katolight CORPORATION
Box 891-12, Mankato, Minnesota

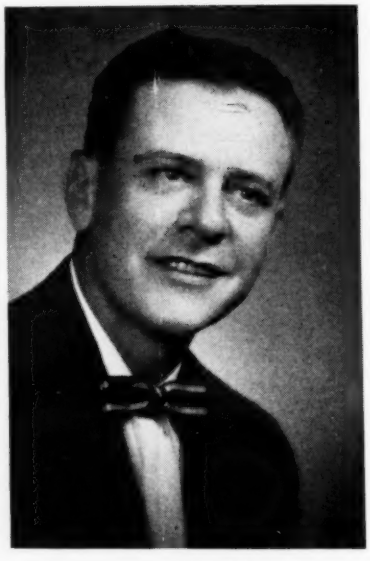
Blaw-Knox equipment division manufactures and sells commercial and railroad grating, transmission and communications towers, steel forms for the construction industry, clamshell buckets and steel plant equipment.

Mr. Loxterman succeeds Arthur A. Levison, who has been assigned to the headquarters staff of E. C. Rook, vice president-general manager of the fabricated products group. Mr. Loxterman has been associated with Blaw-Knox since 1930 and has been assistant general sales manager of the division since 1952. In addition to his new post he will continue as sales manager for steel plant equipment.

Mr. Pottmeyer succeeds A. H. Jackson, who recently was advanced to general manager of the division. Mr. Pottmeyer was formerly chief product engineer of the steel plant equipment department and has served in a variety of engineering capacities since joining the company in 1927.

Kellogg Names R. A. Stoll To Western Sales Post

Robert A. Stoll has been appointed district manager for the western sales division of Kellogg Switchboard & Supply Co., a division of International Telephone & Telegraph Corp., according to an announcement released by O. C. Bailey, sales manager, Chicago.



R. A. STOLL

Mr. Stoll will supervise Kellogg's sales activities in the states of Missouri, Kansas and Colorado and will report to the western division manager in Kansas City, Mo. He joined the Kellogg company in 1951 as a field representative in Colorado and Kansas, prior to which he spent three years with the Columbus (Kan.) Local Telephone Co. as plant superintendent.

Mr. Stoll served with the United States Army Signal Corps from 1942 to 1946, serving three years in Africa and Italy. He is active with the American Legion.

V.P. Russell to Assist REA Borrowers in Florida

Virgil P. Russell who has been located in Washington, D. C. as head, accounting section, REA telephone program, has been transferred to Florida in the position of field representative, operations, to assist REA telephone borrowers in that state with accounting, management and operation matters, it was announced on July 23.

Mr. Russell was employed by REA in December 1949 as a telephone program consultant to establish telephone accounting procedures.

He began his career in the telephone industry in 1920 as an accounting clerk and later traveling auditor with the Ohio Bell Telephone Co. at Columbus.

After serving with Bell some years he was employed by Independent telephone companies in Ohio and Indiana, the West Virginia Public Service Commission and as head accountant, field division, for the Federal Communications Commission.

In 1943-1946 he was finance officer for the U. S. Commercial Co., Rio de Janeiro, Brazil, and in 1947-1948 deputy chief, communications branch, Office of Military Government for Germany (U. S.), Berlin, Germany.

Half in Jest

"When a true genius appears in the world you may know him by this sign, that the dunces are all in confederacy against him."—SWIFT.

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Selenium Type Regulated

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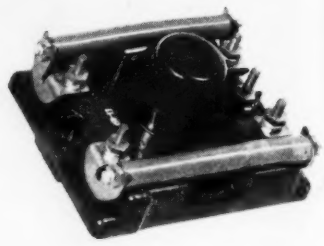

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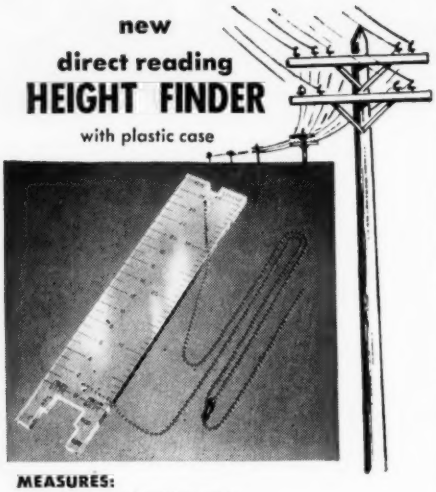

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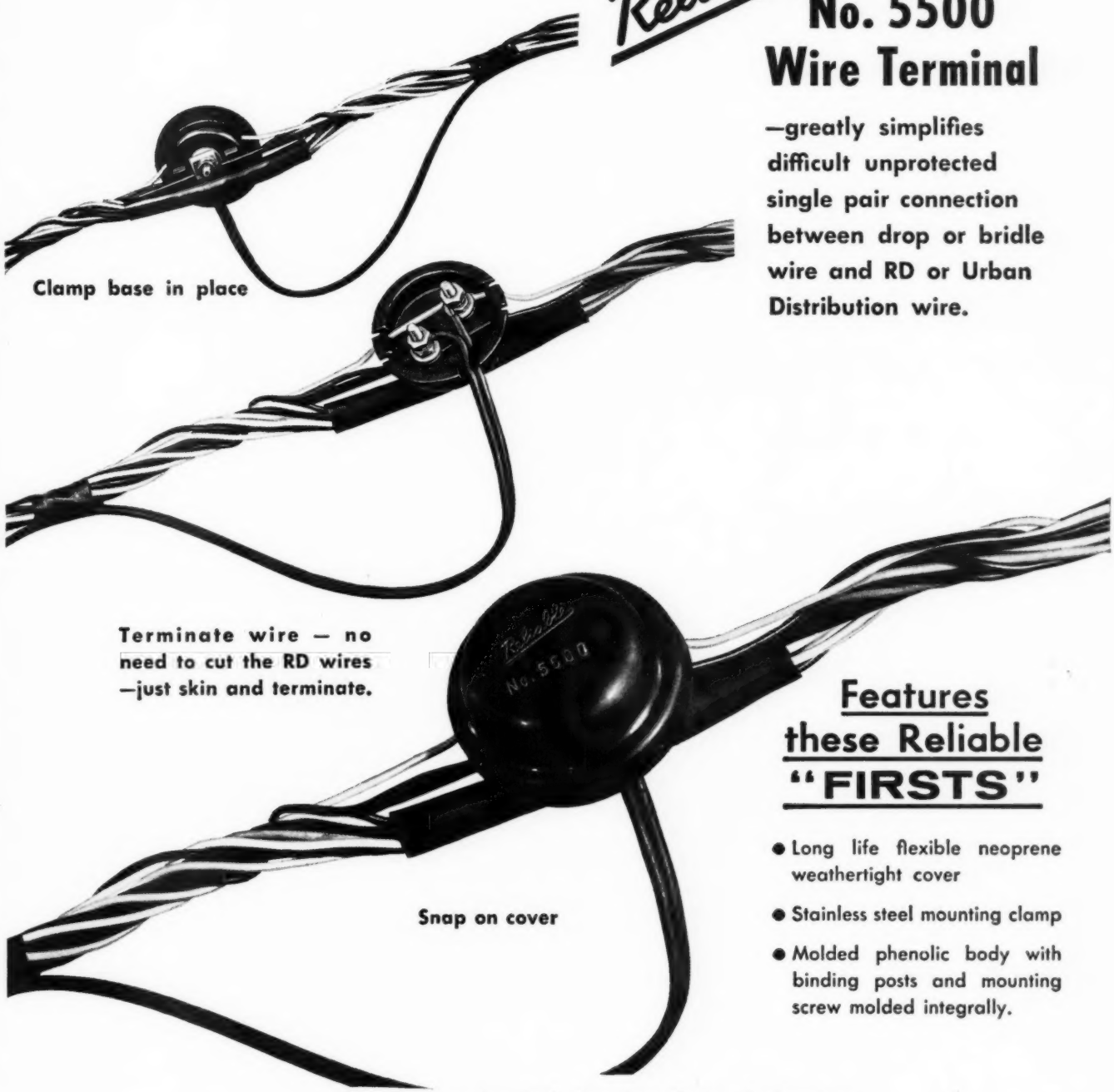

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